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AFTER a longer delay than we anticipated, our first "Monograph of Architecture" — the Harvard Law School building — is now ready, and we refer our readers to our advertising columns for further particulars. The standard of excellence we hoped to attain in this publication was sufficiently exalted, but we can say, without feeling that we overstep the bounds of modesty in so doing, that what has been accomplished surpasses our expectations ten-fold — perhaps even a hundred-fold. As the publication of other Monographs will depend on the reception the first issue encounters, and as we are more than ever persuaded that we have had a "happy thought" in conceiving the scheme, we trust that enough architects will feel they can afford to give the modest price asked to stamp approval on our undertaking and assure the publication of further numbers.

THE inquest in the Buddensiek case in New York has been rather a lively affair. The coroner, who, like most New York coroners, seems to have had a very proper opinion of his powers and authority, was judicious enough to call in at once the best experts to be found in the city, without wasting time in collecting the opinions of persons of no reputation, and the evidence obtained at the inquest is so weighty that the criminal trial to follow may be considered as already half decided. The testimony of such builders as Messrs. Darragh, Tucker, Eidlitz and Deems was to the effect that the bad quality of the foundations led to the destruction of the Buddensiek block, and in this opinion most architects will coincide, a brick wall on a firm base, even if laid in mud mortar, not being easily pushed out of position when stayed by floor beams. Upon the question of responsibility for the imperfection of the foundation, which was the main point of the discussion, a good many witnesses endeavored to throw light. One of these witnesses was Gotthold Haug, the legal owner of the ruined buildings, and of the land on which they stood, the conveyance of the estate to him, in return for the payment by him of three hundred and thirty thousand dollars, being properly recorded in the Registry of Deeds, together with the receipt for the purchase money. Although, by virtue of this deed, one of the largest real estate owners in New York, the modest Haug had been at work as a watchman for Mr. Buddensiek for a year or more, at a salary of a dollar a day; including with his services as watchman a faithfulness to his employer's interest which brought upon him the anger of the coroner, who, on his refusal to divulge some secret of his relations with Buddensiek, ordered him to prison, where he was kept until released by a writ of habeas corpus the next day.

ANOTHER interesting witness was Mr. Esterbrook, for several years Inspector of Buildings, who testified that Mr. Buddensiek was well known in the Bureau of Buildings as "an old sinner," and, on account of his general reputation, enjoyed the advantage of having three deputy inspectors set to watch his work where one would have been assigned to ordinary buildings. The present inspector testified that the walls of the fallen buildings were carelessly and hurriedly built with mortar composed of sandy loam carelessly mixed with lime; and a bricklayer employed on the buildings related that after working until they reached the fourth story he became so apprehensive as to their safety that he left them altogether. The testimony was so convincing, that after it was nearly all in, Mr. Buddensiek's sureties, who had bound themselves under a forfeit of thirty thousand dollars to produce him for trial, began to fear that he would run away, especially when the original charge, of manslaughter in the second degree, was withdrawn, and a new one, of manslaughter in the first degree, substituted for it; and they made their appearance in court for the purpose of surrendering their charge. Upon this, officers were sent after him, and he was arrested and put in the custody of the Tombs jailer, we believe, where he remains, together with his contractor for the mason work of the buildings, and the two deputy inspectors, against all of whom the same charge is brought.

ACCORDING to the Boston *Herald*, a great and most wholesome change has come over the fire underwriters in that city. "It is well known," the paragraph informs us, "that the mill mutual insurance companies have succeeded in reducing the fire losses to a very low percentage;" and the Boston Board of Underwriters, having apparently just discovered this fact, has been so much impressed with it as to have taken under consideration "a plan of abating, as far as possible, the fire losses in Boston." Among the methods of accomplishing this object which the Board contemplates borrowing from the mill mutual companies is said to be that of inspecting the mercantile and manufacturing risks in the city every three months, and advancing rates, or cancelling policies, in cases where the property is found in dangerous condition. This will, we need not say, be an admirable plan, and there are many more details of the science of reducing fire risks which might with much advantage be learned of the mill companies, but a great deal of work must be done, and a good corps of inspectors thoroughly trained, before anything like the completeness of control can be obtained over general manufacturing and mercantile business that the mill mutual companies exercise over their members, and we earnestly advise the underwriters to seize the opportunity to avail themselves of the most powerful outside aid that they could possibly have in the virtuous course that they have entered upon, by combining their efforts to promote the passage of the new building law. If they really think that the prosperity of insurance companies will be promoted by reducing fire losses, they are in a proper state of mind for comprehending that the passage of the new law would mean for them the saving of many thousands of dollars of insured property within the first year after its passage, and of further sums, increasing in geometrical ratio, each year, as the buildings now standing were, under its operation, gradually replaced by solid and incombustible ones. At present, the architects, the *bêtes noires* of underwriters' discourse, are maintaining, almost alone, the effort for the passage of the bill. A word from the representatives of the immense capital and influence engaged in insurance business would do far more to secure its enactment than all the arguments that a small body of professional men can bring forward, and if the bill fails for want of the insurance influence, the underwriters will have to pay the losses which it would have helped them to avoid, without much sympathy from people who think it a virtue to take care of one's own interests.

LA SEMAINE DES CONSTRUCTEURS quotes from a pamphlet just published by M. Durand-Claye some definite statistics in regard to the Gennevilliers irrigation and the sewerage of Paris, which are well worth remembering. For some reason, the results of the Gennevilliers experiments have been for a long time obscured by a curious indefiniteness, not to say wildness, of statement on the part of those who pretended to have examined them, which no impartial person seemed to think it his business to correct; but the city of Paris has now definitely committed itself to irrigation as a mode of sewage disposal, and it has become necessary to obtain exact statistics of what has been accomplished, for the benefit of the

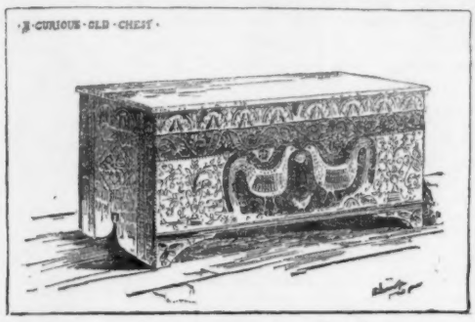
city engineers, and incidentally for that of the rest of the world. To begin at the beginning, the entire efflux through the sewers of Paris is ascertained to amount, on an average, to three hundred and sixty-two thousand cubic metres a day. This is almost exactly three-quarters of the total amount of water furnished by the aqueducts and the rainfall, the other quarter being carried off by evaporation, absorption into the soil, or by flow over the surface directly into the Seine. All the drainage flow, before leaving the city, is collected into three great intercepting sewers, two of which, conveying three hundred and eighteen thousand cubic metres a day, join into one at Clichy, just above a pumping-station, where engines of eleven hundred horse-power lift a part of the liquid into the pipes which convey it to Gennevilliers, while the surplus is allowed to flow into the Seine. The remaining intercepting-sewer carries forty-four thousand metres a day by gravitation to the Seine at Saint-Denis, but a branch is taken from this early in its course, which conducts a portion of its flow to Gennevilliers, to supplement the main irrigation system.

THE main irrigation conduit, which leaves the great double intercepting sewer at Clichy, is of rubble and Portland cement, forty-nine inches in diameter. After reaching the irrigated fields it gradually diminishes in size, throwing off branches, formed of concrete, and varying from fourteen to forty inches in diameter, until it ends in a small pipe, of twenty inches diameter, which serves as an overflow, to carry the surplus liquid of storms into the river. The supplementary irrigation-main branches in the same manner over a different portion of the territory, and the filtered effluent is conducted to the Seine by collecting drains. The present area of irrigated land in the Gennevilliers peninsula is fourteen hundred and thirty acres, and the system is continually being extended to new land at the request of the owners. The whole amount of sewage brought to the peninsula by the drains is eighteen millions of cubic metres a year, or about twelve thousand metres annually to the acre, an amount sufficient, if delivered at once, to cover it all about nine feet deep. Experiments have been made to determine whether a larger flow could be advantageously used, and for growing beets it seems likely that much more could be absorbed; but for general purposes the present flow is well proportioned to the needs of the ground, and the annual return from the crops is from two hundred and fifty to eight hundred dollars per acre, and even more where a cultivator has made a fortunate choice of a special product. The rent paid for the land has tripled within a few years, and averages now thirty-eight dollars an acre, while the population of the place increases constantly by the arrival of farmers anxious to share in the profits of sewage cultivation. Judging from the results obtained here, the engineers of the city have concluded that ten thousand acres of ground will satisfactorily and profitably purify the whole of the sewage of Paris, and have set about inquiring for suitable territory to that amount. The districts of Achères and Saint Germain, which have already been condemned and taken for the purpose, will furnish only three thousand acres, in addition to the two thousand contained in the Gennevilliers peninsula, so that five thousand more must, sooner or later, be found somewhere; but there can be no doubt that, with anything like the high rents paid at Gennevilliers, the returns from the land taken for irrigation would make the expense of taking it a safe and profitable investment for the Parisians. It is rather singular that the experiment of sewage irrigation, although rather rudely tried, should have proved so much more successful at Paris than in most places in England, but something is undoubtedly to be allowed for the difference in climate, and the science of sewage utilization will not advance much farther until careful investigations are made in regard to this point.

M. ROGÉ, the President of the Chamber of Commerce at Nancy, in France, has made a certain contribution to the discussion of the labor question, in a paper read by him before the Chamber, and reported in *Le Génie Civil*. M. Rogé's paper begins by pointing out the defects in the system, now becoming common, of sharing a certain part of the profits of a manufacturing business with the workmen employed in production. Excellent as the results of this system have been, M. Rogé thinks that it may tend, by increasing the income of the workmen in professions, to form in them habits of extravagance which will be the source of nearly as much complaint, and perhaps suffering, when reverses come, as the cut-downs and reductions of wages under the old method; and he suggests, with some reason, that a manufacturer who allows his men to participate systematically in his profits, is likely to find more difficulty in appropriating the profits of two or three years to the improvement of his machinery, or the introduction of new processes, than if he kept the whole income of the establishment under his control. As a remedy for this, M. Rogé proposes to make the premium, or share of the profits to be awarded to each man at the end of the year, dependent upon his personal success in executing through the year the duties entrusted to him. A foreman, on this plan, should have his dividend graduated inversely according to the cost of the articles produced in his department, so that he may be encouraged to vigilance in enforcing economy and efficiency, while the individual workmen should have special prizes for economy in the use of material, for thoroughness and finish of work, and for care in keeping their tools in good condition. In this way, as M. Rogé thinks, each man's share of profits would depend directly and visibly on his own care and activity, and the total result would be great increase of efficiency, without involving any sacrifice or compromise of the employer's interest.

EVERY one will be glad to know that the comparatively clumsy and slow methods of killing one's neighbors now in use are likely to be superseded by the introduction of an admirably neat and compact revolver, of a type entirely new, which, although so small as to be comfortably carried in the vest-pocket, enables the owner to shoot down ten persons before stopping to reload. It seems from *Le Génie Civil* that the inventor of this delightful instrument, having found in his practice that pocket Derringers and revolvers were much less steadily held in the hand than weapons of military size, and were in consequence easily wrested from the grasp of the user by an antagonist at close quarters, undertook to design a weapon which, without loss of portability, could be held securely, and fired with greater ease and certainty than those of the old patterns. These objects he has successfully attained, together with a great increase in the number of shots carried, by changing the cylinder which holds the cartridges in the ordinary revolver into a thick, flat ring, in which the cartridges are set radially. The diameter of the ring in the actual weapon is one and thirteen-sixteenths inches, and it is drilled for ten cartridges, of about twenty-two one-hundredths of an inch calibre. The ring fits upon a short cone in the box which contains the mechanism of the pistol, and can be detached and replaced in a moment, like the chambers of some patterns of revolvers. The remaining parts of the mechanism are very simple, and the whole, except the barrel and the trigger, is contained in a box two and one-sixteenth inches in diameter, or about the size of an average watch. The barrel, which is rifled, is one and three-eighths inches long, but a longer or shorter one can be substituted, as it simply screws into a socket left for it in the case. The pistol is intended to be held flat in the palm of the hand, the barrel protruding between the second and third fingers, which are helped in holding it firmly by two lugs cast on the case; and the firing mechanism consists of a small, curved lever, hinged at one end to the case, and shaped to fit the lower portion of the palm of the hand grasping the pistol. The rest of the lock is inside the case, and is arranged on the self-cocking principle, so that the pressing of the lever, by the contraction of the hand, turns the cartridge ring and secures it in position, and cocks and releases the hammer, by a single motion, which can at once be repeated after allowing the lever to return to its place by relaxing the grasp. A little wedge, which slides on the rim of the box, may be pushed under the lever to stop the movement, and prevent accidental firing; and after the ten cartridges are discharged, a simple movement opens the case, when the cartridge ring can be turned out, the shells removed and new cartridges inserted, quite as easily as in any pistol now in use. The whole length of the weapon, from the extremity of the barrel to the most projecting portion of the firing lever, is just four inches, which can be reduced to two and five-eighths by unscrewing the barrel. As the barrel follows the direction of a radius of the outline of the case, there is no way of sighting over it, but the firmness with which the pistol is held in the hand gives a certainty to the fire which the sights of a Derringer or a twenty-two calibre revolver do very little to secure.

HINTS ON PLASTERING, MORTARS, ETC.



IT is not an uncommon complaint from proprietors of dwellings, hotels, office-buildings, etc., heated by furnaces, or by steam, that in a few years after being constructed the interior finish of brick walls commences to scale off, if painted, or the entire plastering comes loose from the walls in patches four or five yards in extent, and seemingly rotten, the cementing qualities all gone. This scaling off of the paint or falling off of the plastering being confined to the brick walls only, the stud partitions, lathed ceilings, and furred brick walls remaining good, there is no room for doubt but that a very large proportion of the mortars used in the construction of modern brick walls, as well as that employed for plastering, is improperly proportioned, badly mixed and too quickly used, and hence possesses only in a low degree those valuable properties of strong coherency of their component parts and the quality of adhesiveness.

The responsibility for the damages to buildings arising from the employment of poor qualities of mortar should often rest as heavily upon the architect as upon the contractor, the bricklayer or the plasterer. In the vast area covered by the United States, there are so many different kinds of mortar employed for the purposes of constructing and finishing buildings, that it would be impossible to formulate a rule which would result in producing good mortar from the materials found in the various sections of the country. But it is the business of the architect to thoroughly familiarize himself with the materials found in the section covered by his practice and used for mortar-making. After becoming acquainted with the materials, the architect should specify the qualities and proportions of lime and sand to be employed, and the manner of mixing, and the age of the mortar before use.

As the defects which have been mentioned are confined to the interior finish of brick walls and do not affect ceilings or other plastering work not in actual contact with brick-work, it is evident that we must look farther than the plastering for the cause of the damage. Experience has clearly demonstrated that mortar, of whatever kind, is greatly affected, either for good or for evil, by the nature and the quality of the bricks or stones with which it is brought in contact, and, consequently, in order to obtain the best constructive results the material over which the mortar is applied should receive proper attention. An experiment made by the writer, with a view to demonstrating the action of the ordinary mixture of cement and lime mortar used by bricklayers in the City of Washington in foundation work on the common varieties of bricks, showed that the strength of the same mortar greatly varied with different kinds of bricks, being lowest with those of greatest porosity. Two hard-burned arch bricks, each having a surface measurement on their mortar faces of 7.75 x 3.75 inches separated under a pull of 43 pounds to the square inch. Two red bricks measuring 3.25 x 4.06 inches separated under a pull of 34 pounds to the square inch. Two salmon (soft) bricks measuring 8.75 x 4.3 inches, separated under a pull of 15 pounds to the square inch. The bricks had laid together for about six weeks and the joints of mortar between them were one-half inch thick, the same as those used for ordinary brickwork. The bricks were good hand-made stock moulded from moderately strong clay, but if they had been manufactured from meagre or weak clay, the results would have been lower than those which have been given. The cementing qualities of mortar, consequently, not only depend upon the kind of bricks to which it is applied, but also upon the nature of the clay from which the bricks are made, and also upon the manner in which they are moulded. Bricks made from tempered clay and solidly moulded increase the cementing qualities of mortar, but bricks made by the so-called dry-clay machine process lessen the strength of the mortar, as the first class of bricks are close and compact, and the latter are commonly open and porous. The poor results obtained with "salmon" or soft bricks was unquestionably on account of their great porosity, as during the setting of the bricks the mortar yielded its water of hydration too quickly, the porous bricks soaking it up more ravenously than would be done by a sponge. This is not to be wondered at, when we remember that each "salmon" or soft brick can easily absorb one and one-half pints of water.

From the foregoing remarks it will be seen that the falling off of the plastering from brick walls is more liable to happen in structures, the interiors of which are built with "salmon" or soft bricks. Some plasterers take the precaution to thoroughly wet the walls constructed with salmon bricks before applying the plastering. But even a thorough drenching of the bricks is of much less value than is commonly supposed, and can never be depended upon to secure immunity from damage in all cases. One reason why dampening the salmon-brick walls with water is not effective is that the plastering is commonly put on the walls during the summer season, and during exceptionally warm weather the evaporation of the water quickly takes place, and the porous bricks continue to absorb the moisture from the mortar, thus robbing it of its strength.

In cheap and shoddy buildings erected for speculative purposes it is not a common custom among architects, proprietors, or contractors to bestow much thought upon the manner in which the plastering or any of the other branches of construction is performed; but in all other cases it is better, if salmon bricks have to be used, for the architect to specify that all walls constructed of soft bricks shall be furred.

In the November and December, 1884, monthly numbers of this journal, the writer treated the subject of "Saltpetre Exudation upon Brickwork," and if the plastered or painted walls should be damp the interior finish would be destroyed in the same manner as brick walls exteriorily finished by painting or with stucco, as was explained in the previously-mentioned article, and which explanation it is probably not necessary to recapitulate in the present paper. In case the plastering is liable to become detached from brick walls on account of dampness, furring is the only remedy.

Having recommended furring, for dry walls constructed of soft bricks as well as for damp brick walls, it now only remains to say in the same connection, that those portions of structures which are to be continuously inhabited, such as sitting-rooms, chambers, etc., of dwellings, ought never to be plastered directly upon the brick walls. In buildings which are designed to be fire-proof, iron lathing would, of course, be employed in lieu of furring.

In our large cities cast-iron for architectural purposes continues to be commonly used for the piers or columns of the lower floors of stores and warehouses. These piers are sometimes hollow iron columns, ornamented on the sides exposed to the weather, in order to produce the desired architectural effect, and plain on the side or sides which form part of the walls of the apartment which the piers aid in enclosing. These apartments or stores are usually plastered, or have what are commonly termed hard-finished walls, and it is desirable that the inner sides of the piers should correspond in finish with the other parts of the interior walls. The inner sides of the iron piers are therefore often partially cased with furring to which laths are nailed in order that the surface may be plastered; in other cases, the iron surface is wholly covered with a wainscoting or casing of boards, and at other times the iron surface is merely painted. Both the furring and the wainscoting are objectionable on account of the expense and their tendency during a conflagration to warp and often break the columns, and when merely painted the surface is not good. A method which is now common property, has been successfully used to obviate the defects which have been mentioned, and it consists in piercing that surface of the pattern which corresponds with the inner surface of the pier to be plastered, with a number of small holes in which are loosely inserted either wrought or cut nails, or small pieces of wire, or cones or pyramids of cast-iron, so that they shall project from the surface. When nails are used they should be put in point first; when wire is employed, the axis of the wire should form an oblique angle with the surface, and all the nails or cast-iron should project from the surface of the pattern, as far as may be necessary to ensure a lock for the plaster. When the pattern is prepared, it should be laid face upward in the flask and moulded upon in any proper way, and when the pattern is drawn, the nails, wires, or pieces of cast-iron are to be left sticking in the sand; when the iron is poured in, it will surround the nails, etc., and when cold and removed from the sand the surface of the iron pier or column will be of such irregularity as to retain the plastering. Surfaces produced in this manner can be readily plastered after the piers or columns are placed in position, and the finish obtained upon them is better than that produced by furring the columns or piers, and in addition, it is cheaper, more durable, as well as more economical of space, and protects instead of endangering the piers or columns in case of fire.

Casing iron piers and columns with fire-proof materials, as well as lathing with iron lathing, is now often practised, in the construction of expensive buildings, but the method previously described could often be used to great advantage in cheaper structures where first cost is an item.

Having in the foregoing portions of the present paper somewhat enlarged upon the preparation of good foundations for the reception of the plastering, the question might reasonably be asked: — "Do not the defects mentioned in the commencement of this article often occur from the employment of inferior mortar? and, what constitutes good mortar? and what is the theory of its preparation?"

To the first interrogatory we would unhesitatingly reply in the affirmative. Too much and poor quality of sand, too little and poor quality of lime, too little mixing, too little time for ageing, too little time for drying after applying the mortar to the wall, too much hurry to get on the white coat, and get the cash for the job, are defects which are only too apparent under the present system of contract work to be enlarged upon here. There is no possible way to remedy these defects except through architects and superintendents charged with the execution of the work, for just so long as such defective plastering is accepted and passed by those whose duty it is to condemn it, just so long will the evil continue. There is, of course, no excuse for an architect or any other person who would abuse his power to such an extent as to impose unnecessary expense and trouble upon a contractor. But duty to his client and his own interest demand that an architect shall specify the proportions and

qualities of the ingredients employed for mortar, and require and know when it has been properly prepared and applied.

The second interrogatory: "What constitutes good mortar, and what is the theory of its preparation?" is not readily answered, especially the first clause of the question. "Mortar, being a compound concocted of such variable ingredients, and subject to a great variety of treatment, no specific value or estimation is possible, unless it is described as being compounded of a certain quantity of lime, to be mixed with a definite quantity of sand." We have previously stated in substance that "The best and most desirable property in a good mortar is, that the materials of which it is composed shall not only be competent to secure profitable coherency of its component parts, but also possess the quality of adhesiveness, and thus bind together or cling to the bricks or other forms in the structure in which it is to be used."

Aiken states the general theory of mortar as follows: In the white limes or nearly pure carbonates of lime the only effect of burning them is to drive off the carbonic acid. By slacking the lime becomes a hydrate, and in this state is capable of acting chemically, though feebly, on the surface of pure silicious sand. This combination causes the first setting of the mortar, which is also strengthened by the mere mechanical action of the sand. The greater part, however, of the lime has not combined with the sand, but remains in the state of a hydrate. In proportion as this latter absorbs the carbonic acid from the air, it gives out its water and passes to the state of carbonate; such mortar, therefore, acquires its final induration and dryness when the whole of the hydrate has been decomposed and the water has been replaced by carbonic acid. In losing twenty-two per cent of water it combines with forty-six per cent of carbonic acid, and, therefore, the mortar becomes the more solid and strong.

Limes derived from comparatively pure carbonates have a decided tendency either to yield their water of hydration too quickly, or not to part with it at all. If the water of hydration is permanently retained by the lime, there results a moist pasty product, and if yielded too readily, the rapid loss of the water of hydration results in a dusty, pulverized mass.

The Romans in dealing with such limes invented numerous shifts to counteract the tendency to the extremes which have been mentioned. "Hence, we find, in the best remains of the old Roman mortars a careful and perfect blending of the lime with the sand, and, generally, the insertion of thin porous tiles or bricks to absorb any superfluity of moisture." The Romans were the best mortar-makers of history, and it was an absolute condition imposed upon all persons engaged in engineering as well as architectural construction, that the ingredients of which the mortar was composed should be thoroughly blended together.

The differences between fat, poor, and hydraulic limes are so commonly understood that it is not necessary to enlarge upon them here. But whatever may be the character of the lime, if it has been freshly burned and the details of its manufacture have received proper care, it should be capable of thorough incorporation with any suitable material for the production of mortar.

It is, of course, evident there should be used sand which is as clean, sharp, and as coarse as possible. Should the sand not be naturally clean it is essential that it should be freed from foul and loamy admixtures by washing. For the production of good mortar it is an imperative condition that each particle of sand shall be completely coated with lime; fine sand, consequently, requires a larger proportion and a more diffusive state of the hydrate of lime than a sand coarser in its nature. Bank or pit sands, on account of their mixture with fine silt or loam, are not usually so desirable for mortar-making as those taken from rivers and similar sources. Sea sands, unless thoroughly washed, retard the setting and destroy the strength of mortars.

When a "batch" or quantity of mortar is to be "made up," all of the lime necessary should be slacked at least twenty-four hours before it is used. On slacking the lime all the water required should be "run on" at about one time, and after the lime has been properly submerged, the mass should be covered with a layer of sand or otherwise and allowed to remain undisturbed for the required period. The common error of working the lime with the hoe during the time it is slacking should not be practised. As all mortars are greatly improved by working them, "and as fat limes gain somewhat by exposure to the air, it is advisable to work mortar in large quantities and afterward render it fit for use by a second manipulation." The foregoing remarks apply to bricklayer's mortar as well as to coarse stuff used by plasterers for first and second coats; but in regard to the hair used for the latter classes of mortar it may not be amiss to state that it should be only medium in length, properly cleansed from the lime or other substances used in depilating the hides, free from lumps, and dry. Various materials, such as sulphates, etc., have been employed for increasing the strength of lime mortars, and when plaster of Paris is used for such a purpose it should be added in small quantities and thoroughly mixed with the lime, and in case of such addition of a sulphate, the proportion of sand can be somewhat increased.

On account of the interest usually exhibited regarding the strength of brickwork when laid in either lime or cement mortar and also of concrete when composed of cement mortar and broken stones or other similar material, we here append a description of two mechanical tests by compression made with such materials at the Watertown Arsenal, Mass., on the 18th of November, 1884.

These tests were made at the request of General Montgomery C. Meigs, U. S. Army, who communicated them to the writer.

The specimens were taken from the foundation under the steps leading to the north portico of the Capitol building, at Washington, D. C., the steps having been lately removed in order to allow the construction of the marble terrace wall now in progress around three sides of the Capitol building. The bricks and concrete were laid in position under the direction of General M. C. Meigs, twenty-five years previous to the time when the tests took place, the results of the tests being as follows:—

Bed surfaces faced with plaster of Paris.

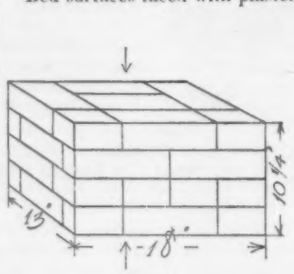


Fig. 1.

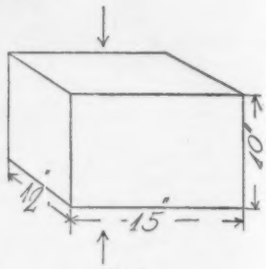


Fig. 2.

Figure 1. Four courses of brick laid in cement mortar.
Average thickness of bed joints, $\frac{5}{8}$ inch.
Total weight, 178.5 lbs.
Weight per cubic foot, 128.6 lbs.
Compressed area 13 x 18 inches = 234 sq. inches.
First crack at 360,000 lbs. = 1538 lbs. per sq. inch.
Crushing strength 578,000 lbs. = 2470 lbs. per sq. inch.

Figure 2. Concrete composed of cement mortar and broken stones.
Irregular block.
Total weight 150.5 lbs.
Weight per cubic foot, 144.5 lbs.
Compressed area 12 x 15 inches = 180 sq. inches.
First crack at 112,000 lbs. = 622 lbs. per sq. inch.
Crushing strength 135,300 lbs. = 752 lbs. per sq. inch.

CHARLES T. DAVIS.

THE DISCOBOLUS OF NAUCYDES.[1]

LONDON, ENGLAND, DECEMBER, 1884.

ANOTHER hand-book of Greek and Roman sculpture, as thorough as the volumes of A. S. Murray and W. Perry, and more handy, comes to us from Boston. It could not come at a more happy time than just after the installation of cast museums at Cambridge and South Kensington. "Principally," as the title announces, and it might almost be said "substantially," it represents the "Bausteine" (Building Stones) of the late Dr. Friederichs. The original work had direct reference to the antiques and casts of the Museum of Berlin, a very extensive collection, but still of necessity incomplete. The editor and translator therefore, — Mr. Cady Eaton, formerly Professor of the History of Art in Yale College, — has added many supplementary articles of his own, besides various annotations which for the most part very judiciously check or correct some of the more questionable theories of Dr. Friederichs. Not, however, that Friederichs was habitually given to theorizing in the wild manner of too many of his compatriots, when given as they are — be it said with all respect — to expatiating on epochs of art, schools, styles, ascriptions, till they lose their own way in their eagerness to keep out of routes that have been well cleared by rivals and predecessors. The book is really a hand-book in the sense that it may be conveniently held in the hand in front of the objects criticised during a visit to a gallery — the chief, and indeed for so many people the only occasion when the detailed criticisms it affords are of interest or of use. It has also the negative merit, which latterly we have been learning to value in Europe, of not offending us — entirely unillustrated as it is — by employing bad art as professed aid to the appreciation of the finest.

The scheme of the book comprises a distinct description and criticism of each several work of ancient sculpture which is of interest from its excellence or place in history. The arrangement is as precisely chronological as the nature of the case admits, and each division is introduced by a brief statement of the artistic character of the period. In giving the book very hearty commendation we are far from saying that the field is not open for a still better book, — or, we would prefer to say, a farther corrected edition of this, without any considerable increase of bulk. There is "something," says Pope, "previous e'en to Taste; 'tis Sense," and how far the pretensions of

[1] *Hand-Book of Greek and Roman Sculpture.* By D. Cady Eaton, M. A. (formerly Professor of the History of Art in Yale College). Principally from the "*Bausteine*" of Dr. Carl Friederichs, late of the University of Berlin. Second edition, enlarged and revised. Boston: James R. Osgood & Co., 1884. Price, $2.00.

plain common sense may be useful after German learning and industry have done their utmost and taste its best, might be exemplified in some of the articles which the editor lets pass without observation. Discursive criticism, however, would be less interesting and less useful than remarks upon a particular statue.

A statue of a youth holding a discus in his left hand and standing in a peculiarly expressive attitude, has long been known by the title first assigned to it by E. G. Visconti, of "The Discobolus of Naucydes." It stands, and has stood since its discovery by Gavin Hamilton on the Appian Way, in the Sala of the Biga or marble chariot, in the Vatican. The completeness of its preservation is remarkable; this seems to have been largely owing to the number and solidity of the marble stays which are still attached to the limbs. These are more than are necessary for the support of weights, but seem to have been left to strengthen the parts against shocks in transport and not afterwards cut away. The good preservation throughout, the fine outlines and graceful yet vigorous proportions of the figure, have always made it a favorite model with students. On this account it has gained in Italy the name among artists of *la statua di precetti*, and in casts it is one of the most frequent as most useful accessions of English art-schools. There is an ancient copy in the British Museum, but casts of the finer statue at Rome are easily obtainable.

It has been said that the attitude is peculiarly expressive: it is manifestly intended to be so; but as in other parallel cases, this manifest intention throws upon the spectator the responsibility of duly appreciating the expression, of divining what is the dominant and immediate motive which decides a specific combination of gestures, aspect and attitude. This appreciation is required even by a photographer if he is to determine rightly the most characteristic point of view; but it is above all required by the student, who only merits the name of student when he copies the figure before him under the influence of such sense of its impressiveness as will secure him from reducing it to blank dullness or insensibly leaning to a perfectly false interpretation.

How far astray interpretation may go is exemplified in the title "The reflecting Discobolus," which heads the article upon it in the hand-book or guide now under consideration. It is fair to say, however, that this erroneous gloss is not due to Professor Friederichs. We must, I fear, lay it to the charge of the editing professor. He in his turn, it may be mentioned here, must certainly be acquitted of the blundering title, "The Venus of Kallipygos," for his notes indicate clearly that he understood the distinction which gave to Venus the title Kallipygian. Professor Kekulé has given an elaborate interpretation and description of this quoit-player in the German *Archæological Journal*, 1866, p. 169. He says justly, "the right hand is raised in readiness to grasp the discus, and there is an involuntary play of the fingers." Less happily he goes on, — "the next moment the youth, stepping forward with the left foot and straightening himself, will raise the discus with both hands to the height of the eye." Some vase paintings do show the discus so raised and with the left foot in advance (Panofkabild. Ant. Sel.), but this does not suit our statue. If this discobolus is to move his left foot in advance of the right, before the actual delivery of the discus, he must change the position of the right on the ground, and turn it more outwards, but this is contradicted by the firm set so distinctly marked by the contraction of its toes in immediate preparation for the cast.

Professor Overbeck, who hands over the statue to Alcamenes from considerations which are truly not worthy of being further considered, marks down various — as he thinks — misconceptions of the gesture by various critics, and adds another on his own account. This peculiar gesture, he says, does not denote that the athlete is reckoning on the fingers the distance of the mark, nor is his look directed to this mark, but towards the ground at a short distance; nor is it a gesture with which the youth is involuntarily recalling himself to greater attention; nor, as interpreted by Friederichs, an "involuntary sign by muscular expression of a thought which is occupying his mind, — an unconscious monologue;" "the arm," he says, "is extended and raised, and the fingers play (are in lively movement) in order to test their elasticity, and at the same time to elicit a feeling of the favorable moment when his force is most collected, the tension of his muscles the briskest, his grip the most secure; at the next instant the discus with a swift movement is to be raised high in front and transferred to the right hand, when the proper action as we know it from Myron's statue, begins."

Perry adopts, from Overbeck, or originates on his own part, the notion that the athlete is moving the fingers of his right hand as if to test their strength and pliancy, but he unhappily misses the better hint as to the direction of his look, and says, "he is measuring the ground with his eye." Also, he says he is in the act of "taking up his position,"— not, that he has taken it up.

Visconti, the earlier critic, praises the beautiful proportion of the limbs, the simplicity of the expressive attitude of the athlete, who "plants his right foot on the ground to prepare for hurling the heavy discus which is still held in his left hand, preparatory to passing it to his right for the throw." So far excellent, but "his physiognomy," he pursues, "expresses the attention of one who measures at a glance the course which he has to give to his bronze discus, or who estimates the marks of his competitors."

Mr. Murray (1,233), in treating of the motive of Myron's type, observes: "It is clear that the motive has been taken from real life, and has been treated in a manner as far removed from ideal treatment as was probably possible at the time." He then goes on to say: 'Compare, for example, the other well-known type of a discobolus, who, as seen in two statues in Rome, stands with one foot drawn back, in the act of beginning to collect his impulse for the throw. Here the motive is also real, but the treatment is due to the ideal manner, which imparts a dignity not likely to have been preserved on the occasion." But in this case how shall we escape the obligation to reconcile ourselves to the notion that an accomplished Greek sculptor only attained the ideal at the cost of falling into the abysmal bathos of the Inappropriate?

The hair of the figure is short, but bound by a narrow band; this Visconti assumes to be the *tænia*, indicating a victorious athlete, and the objection of Friederichs that it ought as such to have long ends pendent behind, need not be held fatal.

It ought not be difficult to make it clear that the sculptor intended to represent a discobolus who has taken up his position for the throw, and stands precisely at the momentary pause before he will swing the discus, now sustained by his left hand, round forward and upward to the level of the eye for the aim; holding it there for the moment with both hands, and at the next carrying it backward with the right, as his knees bend and his body inclines forward, to enable him to concentrate the whole force of his system on the discharge; he will take, in fact, the very attitude of the discobolus of Myron. In the copy of this in the Massini palace at Rome, and in correspondence with a gem, the exertion turns the head of the athlete also to the right; in this respect the statue in the British Museum differs, but the head here may not be the original, or, being original, may be one of the frequent arbitrary variations of a copyist.

A small bronze of the British Museum, which Mr. Murray engraves, represents the intermediate attitude, with the discus held high and in both hands. Here the right foot is in advance of the left, as in our statue and as in the Myronian.

It will have been noticed that much if not the chief difference of opinion concerns the peculiar position of the fingers of the right hand. These fingers are somewhat restored, but all the critics agree that there is no question as to the correctness of the restoration; and I am convinced myself of this by a very minute examination, at Rome, of the statue itself. These fingers are simply curved and somewhat stiffened, in natural preparation for grasping the discus, which is coming forward instantly; how instantly is indicated by the contracted toes of the right foot. This contraction is to secure a steady position for the foot when the cast of the discus is in absolute act; it were absurd for the athlete to stand cramping his toes before that moment. Thus it is that the artist indicates a very precise moment intermediate between one pose and another immediately to ensue. The height of misapprehension is reached when the sense of this momentariness is so absolutely lost that the figure is regarded as calculating, considering, nay, as reflecting, according to the title by which Mr. Eaton heads his translation of Dr. Friederichs's article.

It is free for us to ask ourselves whether this required suggestion of merely momentary pause between preparation and act is made sufficiently distinct? If so, how comes it that it has failed so frequently to be recognized? I suspect that the sculptor is not to blame, but that the misconception as to what the athlete is doing, has been just doing, and is immediately about to do next, are due to modern unfamiliarity with the exercise in which he is engaged and its aspects.

I was once looking at a sea piece, with great admiration of the transparency yet movement of the water, the clearness of reflections, elaborate finish of spars and rigging, and so forth, when a naval friend, agreeing with my approval of the picture, remarked: "The captain's dead." In explanation, he pointed out that the rigging of a large vessel was in studied disorder, and that the interval of puffs of smoke implied the firing of minute-guns. Technical illustrations in art demand technical experience in the critic. If hurling a discus in ancient fashion were as familiar an exercise among ourselves as cricket, and as it was in ancient Greece, it is probable that the significance of the gestures and attitude of this figure would be apparent to all of us at a glance. Still, that several attempted interpretations of these have missed a sense of momentariness and inclined to ascribe to the athlete a certain air of deliberation, seems due to a characteristic of style which may have some bearing on the question of the school from which it had origin. The peculiarity which is alluded to is what may be described as a tendency to squareness, to quadrateness: a quality which, according to Pliny, was ascribed to the somewhat uniform type of the statues of Polycletus.

A quadrate figure (*quadrata statura*) in a favorable sense is a compact, well-set figure, but the phrase when used as expressive of a drawback on style must be understood to refer to a preponderance in a composition either of right angles or lines which tell as somewhat too closely parallel. This explains the contrast ascribed to Myron's art. He was said to have been the first to combine truthfulness to nature with a certain complexity (*primus hic multiplicasse veritatem videtur*) and to practise an art of more manifold harmonies (*numerosior arte*) than Polycletus. These expressions seem to correspond most aptly with the contrast between the daring variety introduced into the attitude — the contorted attitude, as Quintilian calls it — of the discobolus of Myron and the simple squareness which prevails in the statues which we have the best reason to accept as representative of works of Polycletus: the Doryphorus or Spear-Bearer, and the youth binding the tænia of victory round his head, the Diadumenos. The two repetitions of the latter statue in the British Museum will explain this. As regards the Discobolus now under consideration, there is no doubt that when we place ourselves at the best point of

view, at that which was most favored by the artist, the silhouette is as varied as admirable, but it is no less true that when we move from this, the outlines of the arms very soon fall into unpleasant and confusing parallelism with the body or with each other, and those of one leg with the other.

Polycletus no doubt may have executed a statue of a discobolus, though there is no mention of his having done so; but this being the case, it seems best to avoid disturbing the conjectural ascription of Visconti, and to continue to refer to the statue as the Discobolus of Naucydes. When a better claimant can make out a better case, the ascription may be changed. To Naucydes of Argos it was originally given by Visconti, simply on the strength of Pliny's notice that a discobolus was one of the statues which gained this sculptor a high reputation. This somewhat thin argument may now be strengthened by recalling the connection between Naucydes and Polycletus, of whom he is said to have been both the brother and the instructor, and who therefore may naturally be considered to have favored and perhaps exaggerated some leading peculiarities of his style. (*Paus.* 6, 6, 1 and 2, 22, 8.)

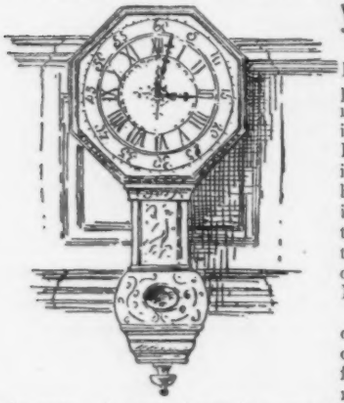
It must be observed that there is much difficulty in reconciling the ancient notices which sometimes indicate an elder and a later Polycletus, and sometimes seem to necessitate the supposition of an earlier and later Naucydes. The combinations above may possibly be thought to have no unimportant bearing on these questions.

W. Watkiss Lloyd.

THE ILLUSTRATIONS.

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE SEVENTH-DAY BAPTIST CHURCH AT NEWPORT, R. I.



THIS venerable edifice, for many years the place of worship of the Seventh-Day Baptist Society in Newport, has, within the last few months, passed by purchase into the hands of the Newport Historical Society, and will in future be occupied by that body as its cabinet and meeting-room. After long disuse, the building was re-opened to the public, with appropriate ceremonies, on the evening of November 10, 1884.

The church, when purchased by the Historical Society, was found to be rapidly falling to decay, through long neglect and the action of the elements. A most thorough restoration became necessary, in the course of which portions of the work were entirely replaced with new, the character and ancient detail being scrupulously adhered to.

The Seventh-Day Baptist meeting-house, or church, as it is more generally styled, has a history of one hundred and fifty-five years, having been erected in 1729. It demands more than a passing notice from the student of Colonial architecture, for its venerable and sacred associations. Its structural and decorative features are thoroughly in unison with the best building practice of the second period of Colonial architecture, and are shown in detail on the accompanying sheets of sketches made in the church itself, previous to its restoration.

In the year 1678, Samuel Hubbard, one of the seven founders of the Sabbatarian Society in Newport, wrote to a friend in Jamaica, saying, "Our numbers here are twenty; at Westerly, seven; and at New London, ten." From the diary of the same Samuel Hubbard we learn that the church was organized in 1671. The Society always claimed to be the oldest Sabbatarian, and the fifth Baptist church in America. The first pastor was William Hiscox, who died May 24, 1704, in the sixty-sixth year of his age. Joseph Maxon was chosen to fill the office of travelling preacher for Westerly in September, 1732, and in October of the same year he was made pastor of both the Newport and Westerly churches. The Newport church, previous to the Revolution, maintained a strong and stirring organization: among its members were men reputable for their talents, learning and ability, and holding honored stations in public affairs. The war scattered the congregation, and the church never recovered its former prestige. Henry Burdick was ordained pastor December 10, 1807. In 1808 the membership was reduced to ninety, and in 1809 to eighty-seven. The last pastor was Lucius Crandall. The records of the church terminate in 1839, and the last sacred services were held in that year. The sole surviving member of the Society living when the church passed out of the hands of the Sabbatarian trustees was Mrs. Mary Green Alger, who died on the 11th of October, 1884, at the age of ninety-three years, nine months and nine days, just one month previous to the dedication by the Historical Society. The church in the town of Westerly grew and prospered, and is still in a flourishing condition. Under the liberal Charter and Constitution of Rhode Island, the towns of Westerly and Hopkinton have always recognized as holy the seventh, instead of the first day of the week. It is a curious sensation to walk through the streets of those towns on a Sunday morning and hear the buzz of machinery and the various sounds of a striving and busy community.

In 1706 the Sabbatarian Society purchased, in the then town of Newport, a lot of land, situated at the junction of what are now known as Spring and Barney Streets, from Jonathan Barney, for "twenty-one pounds, six shillings, and eight pence, current passable money at eight shillings per ounce silver." The deed was taken in the name of Arnold Collins, goldsmith, a member of the Society and the father of Henry Collins, a distinguished citizen who took an active part in the affairs of the town and colony, and was one of the founders of the Redwood Library, giving the land on which that building stands. Two smaller portions of land were afterwards added to the church lot.

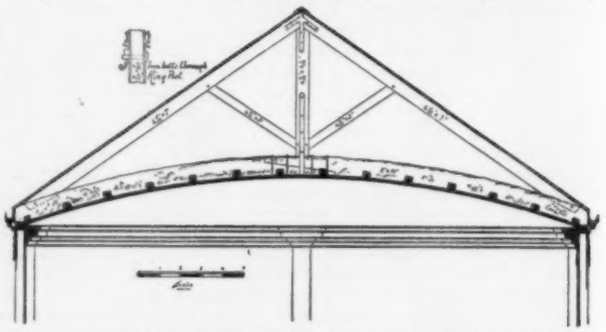
At a meeting of the Society held November 9, 1729, it was voted "that a meeting-house be built, thirty-six feet in length and twenty-six feet in breadth, on part of that land whereon the present meeting-house now stands; and voted, at the same time, that Jonathan Weeden and Henry Collins be appointed a committee to undertake the whole affair of erecting said house, and to raise money by subscription. Voted at the same time, that the two afore-mentioned brethren do their endeavors to make sale of their present meeting-house to the best advantage they can, and dispose of the money towards the better furnishing of the house they are to erect."

The character of the first meeting-house is unknown, but it must have been a very simple affair. The house of 1729 is the subject of this sketch. Like most of the colonial buildings which I have measured, the dimensions overrun the established plan and instructions. The church measured thirty-seven feet front and twenty-seven feet deep, and all its parts and details are laid out with scrupulous exactitude with reference to symmetry and proportion.

The exterior of the church is of the most severe and barn-like character; with two rows of windows having plank frames, and with a shallow cornice, made up of a gutter and bed-mould, the latter mitreing around the heads of gallery window frames. The entrance door has no features worthy of notice, and the steps are of Connecticut brown-stone, the usual material used for that purpose in colonial work.

The roof is a simple double pitch, the frame being of oak timber and shown on sectional drawing. The tie-beams, hewn into curves, are curious instances of framing. All furring-down for the ceiling is dispensed with, and the lathing is nailed directly on the 4″ x 4″ furs, which are tennoned between the tie-beams.

All the timbers, with the exception of the tie-beams, are squared. The framing at the junction of the principals and tie-beams was badly conceived, and the hidden tenons have rotted off, permitting



Note.—The tie-beams are of rough hewn timber, curved by the axe, scarfed in centre. The iron straps are roughly forged and the bolts which secure them to the king-post are simply driven through, the ends turned over and keyed. The timber is all of oak. The furs for ceiling are about 4″ x 4″ and tenoned into the tie-beams at each end. The lathing is directly on the furs. Each principal runs down to a feather end, but is tenoned into the tie-beam and pinned. The building is spread badly, and in its restoration iron tension-rods have been put in between the plates.

the building to spread badly. In restoration it became necessary to insert two tension-rods and draw in the walls to their original vertical position. These rods run across the building at the line of the cornice.

The large drawings indicate the conscientious attention to detail which the Colonial mechanics were wont to bestow upon their works. The greater part of the inside finish is made of red cedar, painted white. All the members were wrought by hand, and the amount of curved and moulded work, including mitres, is extreme.

While engaged in making the measurements preparatory to the restoration, I was struck by a coincidence which gradually developed as the work progressed. It has always been a mystery, unsolved by investigation, as to who designed Trinity Church in Newport. It was erected in the years 1724–25, through the instrumentality of the English Society for the Propagation of the Gospel in Foreign Parts. The plans and instructions must have come from England, as it was not until some years later that architects of talent, like Peter Harrison, emigrated to the colonies. It is a free copy of Wren's church of St. James, Piccadilly, having the general character of that edifice, with, however, some strongly marked differences. Instead of the row of Corinthian columns along the gallery, and supporting the vaulted ceiling, it has square and fluted piers, and the lower piers are much smaller, although panelled in the same way as those at St.

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

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HYDRAULIC LIME.

Hitherto this useful building material, although in very general use in Europe, has been almost unknown in the United States, owing probably to the high cost of importation. In France the famous hydraulic lime of Teil, manufactured at the rate of 10,000 barrels per day, is very generally used for brick, stone and concrete work.

The ordinary quick or "fat" lime so universally used in this country for mortar has no inherent *setting* properties, and when used in a wet or damp place will never harden. General Treussart in 1822 found in one of the bastions of the citadel of Strasbourg, built in 1666, that the mortar used in its construction was still soft. In free contact with the air, lime mortar dries out, and under favorable circumstances slowly absorbs carbonic acid from the atmosphere. Experts assert that ordinary lime mortar laid in the interior walls of brick buildings does not get thoroughly carbonized and hardened for fifty years. That the process of recarbonization is a very slow one may be seen by examining mortar after it has been in a wall for a lifetime. Moisten it and it can easily be crumbled.

On the other hand, if lime mortar is subjected to exposure, as in the case of chimney-tops, outer courses of brickwork, etc., rain and extremes of heat and cold are sure to disengage the mortar and allow the bricks to tumble out of place. *The process of recarbonization does not keep place with the disintegrating influences of the elements.*

In case of fire, common lime mortar is quickly dried out, and the carbonic acid that has been absorbed is expelled, leaving the mortar a crumbling mass that has nearly or quite lost its cementing properties.

Hydraulic lime has inherent *setting* qualities, and the water of mixture is retained and becomes the water of crystalization. This hydraulic property renders it peculiarly valuble in many varieties of work, notably in foundations, cellars, bath-rooms, kitchens and laundries, as moisture only serves to harden it.

Architects and builders often require a mixture of common lime and cement to give mortar hydraulicity and strength. This forms an hydraulic lime mortar, but the combination is only *mechanical*, whereas in natural hydraulic lime mortar the combination is strictly *chemical* or a true *silicate of lime*, the only mortar-making material that can endure for ages the disintegrating effects of the sudden and extreme variations of temperature and other changes in our climate.

In case of fire the extreme heat will only serve to glaze hydraulic lime over and cement the material together all the more firmly. In a few days after it is used hydraulic lime begins to change and gradually hardens. At the end of a month it will appear like cement, and in time will become as hard as the material which it binds together.

Hydraulic lime as prepared for market is pulverized as fine as flour, and needs only to be mixed with sand and water to be ready for use. It requires no slacking; will keep for a year or more in barrels or sacks without deterioration; it has all the smooth and slow working qualities and the sand-carrying capacity of common lime, and when used for plastering requires no hair and does not "pop out" or blister.

Many fine structures have been erected in Europe of concrete made of three parts of lime-of-Teil and one part of water mixed with ten parts of sand, incorporated with an equal bulk of broken stone or coarse gravel.

Of the Vanne aqueduct for supplying water to Paris, thirty-seven miles have been executed in this concrete; in the forest of Fontainebleau there are about three miles of arches, some of which are fifty feet high; the whole structure, including arches and pipe, is one mass of solid masonry without joints. A Gothic church at Vezinet, near Paris, having a spire 130 feet high, is also a monolith of concrete of lime-of-Teil.

The lighthouse at Port Said, the northern terminus of the Suez canal, is also built of concrete of Teil lime and Port Said sand, and is a monolith 180 feet high.

The jetties which form the harbor of Port Said are built of huge blocks of concrete formed of the same material. In their construction 120,000 tons of Teil hydraulic lime were used. There were 25,000 blocks, each weighing 25 tons. The docks of Marseilles were constructed of similar concrete. At the harbor of Algiers, commencing in 1833, the French constructed blocks of hydraulic lime concrete, containing 353 cubic feet each, to withstand the force of the sea. The blocks weigh about 25 tons each. The harbor works of Alexandria, Egypt, consumed 175,000 tons of Teil lime in the construction of concrete blocks similar to those of Port Said.

STANDARD CEMENT CO.,
HARTFORD, CONN.

SLATE.

Few persons are aware of the great merits possessed by slate, fewer still of the many purposes for which it is used. In order to inform those who should naturally be interested in the subject, and to advertise our own business, we have condensed this information as follows, and we think its perusal may be of value:

The principal merits of slate are great strength, imperviousness to water and fluids generally, durability, cleanliness and cheapness. The larger part of the slate rock now quarried is made into roofing-slates, for which the merits above mentioned make it particularly valuable. But its relative cheapness is probably the greatest advantage it possesses over other roofing materials. A recent writer on this subject prepared the following statement, which, while not strictly accurate for all localities, is sufficiently so to warrant the claim of economy:

Slate per square (10′ square or 100 sq. ft.)				$4.50 to	$5.00
Boards	"	"	"	"	2.00
Tin	"	"	"	"	5.50 to 6.50
Shingles	"	"	"	"	4.00
Corrugated iron	"	"	"	"	6.00

Exposure to the weather affects these materials very differently. Slate remains firm and water-proof indefinitely (at least sixty or seventy-five years and longer); boards are efficient eight years, tin nearly twenty, shingles twelve, and iron lasts about twenty years, making a yearly cost per square 7½ cents for slate, 32½ for tin, 25 for boards, 33⅓ for shingles, and 30 for iron. To secure the correct service for the periods named, these substances, with the single exception of slate, must be painted at intervals of four or five years, entailing additional expense.

In communities where cistern water is used, there is no possible doubt of the supreme advantage slate offers as a surface over which rain-water should flow. Its cleanliness and freedom from disintegrated particles of poisonous paint and vegetable growth incident to other materials, especially wood, clearly establish the fact. It is practically fire-proof, and presents a beautiful appearance in its place.

A square of slate is a quantity sufficient to cover a space 10′ x 10′ or 100 square feet. The number of slate required in each size for such square is

28 x 14	83	20 x 14	122	16 x 12	185	14 x 8	328
26 x 14	89	20 x 12	142	16 x 10	222	14 x 7	375
24 x 16	86	20 x 11	155	16 x 9	247	12 x 12	267
24 x 14	98	20 x 10	170	16 x 8	277	12 x 10	320
24 x 12	115	18 x 12	160	14 x 14	188	12 x 9	355
22 x 14	109	18 x 11	175	14 x 12	219	12 x 8	400
22 x 12	127	18 x 10	192	14 x 10	262	12 x 7	458
22 x 11	138	18 x 9	214	14 x 9	291	12 x 6	533

The weight per square varies from 550 to 650 pounds, but is generally quoted at 600 pounds for No. 1 slate.

But a very large and constantly increasing quantity of slate rock is used in the manufacture of structural and other articles such as are named below:

Bricks, flooring, stairways, steps, wainscoting, tiling, mantels, hearths, coping, sills, caps,

register-settings, fire-boards, chimney-caps, mangers, fence-posts, grave-boxes, vaults, monuments, headstones, lamp-bases, imposing-stones, clock-cases, table-tops, bureau-tops, billiard-beds, counters, shelving, baths, urinals, paint, cement, chess-boards, cisterns, sinks, black-boards, school slates, pencils, meat safes, refrigerators, wash-tubs, wash-stands, paving, curbing, tanks, vats, paper-weights, call-bell bases, bracket shelves, etc.

The noiselessness of slate makes it especially desirable for flooring and stairways in churches, schools, libraries, halls and public buildings generally.

BOYLE & COMPANY,
Wholesale Slate Merchants,
419 Walnut Street, Philadelphia.

GIBBS'S CEMENT.

When the late Mr. John C. Trautwine, C. E., stated that "many spurious and inferior articles are sold under the name of Portland cement," he was hinting to the profession and to all buyers and users of cement the necessity of making tests, and purchasing according to quality, instead of the mere acceptance of any article bearing the generic name of Portland; for this leads simply to a question of price, and the quality would be a secondary consideration.

Some manufacturers, in their anxiety to do business, have allowed their quality to decline and traded on past reputation,—a most suicidal policy which was soon discovered, and buyers cannot be too careful in noting the fact.

The importation of Portland cement by Mr. Howard Fleming, of 23 Liberty Street, New York, is conducted on the plan that quality and price must go hand in hand, and his selections are based on the necessities of business. Gibbs's Cement, which is so extensively used by Mr. John Grant, M. I. C. E., for the Metropolitan Board of Works, has a reputation second to none for uniformity in fineness and strength, and the extraordinary results obtained by the use of Gibbs's Cement at the Quebec Harbor Improvement were the subject of a paper read before the American Society of Civil Engineers. For concrete and harbor work it has always had the preference, and some 300,000 barrels were employed in the extension of the Liverpool docks. Many contracts of like magnitude have been supplied throughout the world, and in the United States Gibbs's Cement has found favor and would be more largely used if specifications called for it instead of Portland cement, which permits a contractor to use any article covered by that name.

In addition to Gibbs's Cement, the firm named above imports the following brands from England and the Continent: Knight, Bevan & Strange, from London; Stettiner Portland, from Stettin; Lagerdorfer Cement, from Itzehoe; Fiéve A 1, from Charleroi.

By visiting the works every year the manufacturers are advised as to the necessities of the American market. The standard is maintained for uniform quality and full weight, and advantages are taken of ocean freights, so that the lowest prices can be made to American buyers. Tests for fineness and tensile strength are made frequently, and full information in regard to Portland, Roman and Keene's Cements can always be had from

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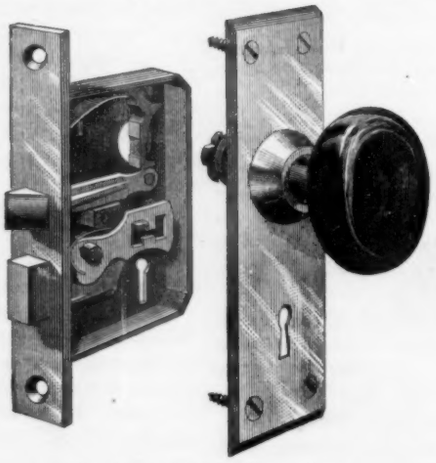

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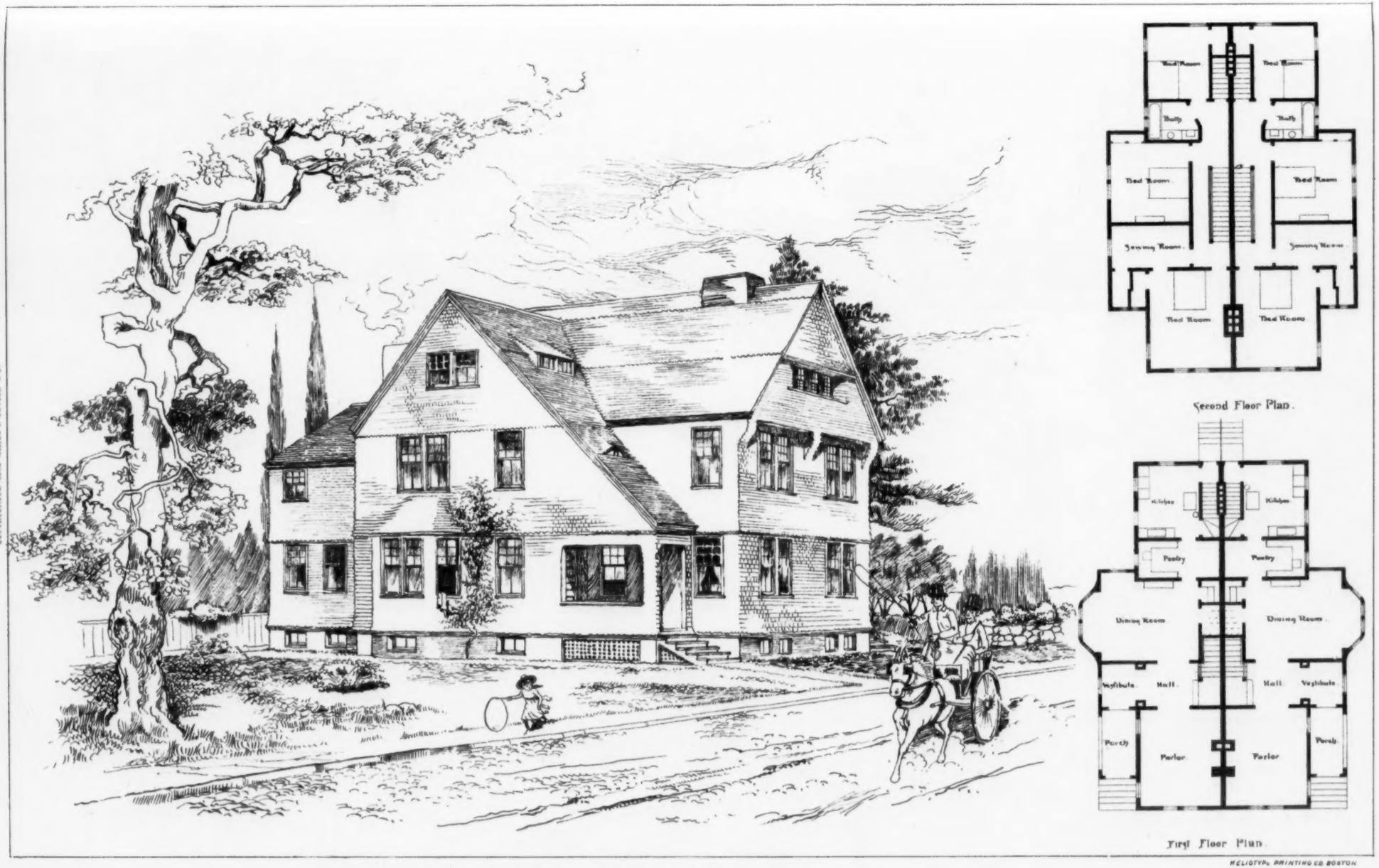

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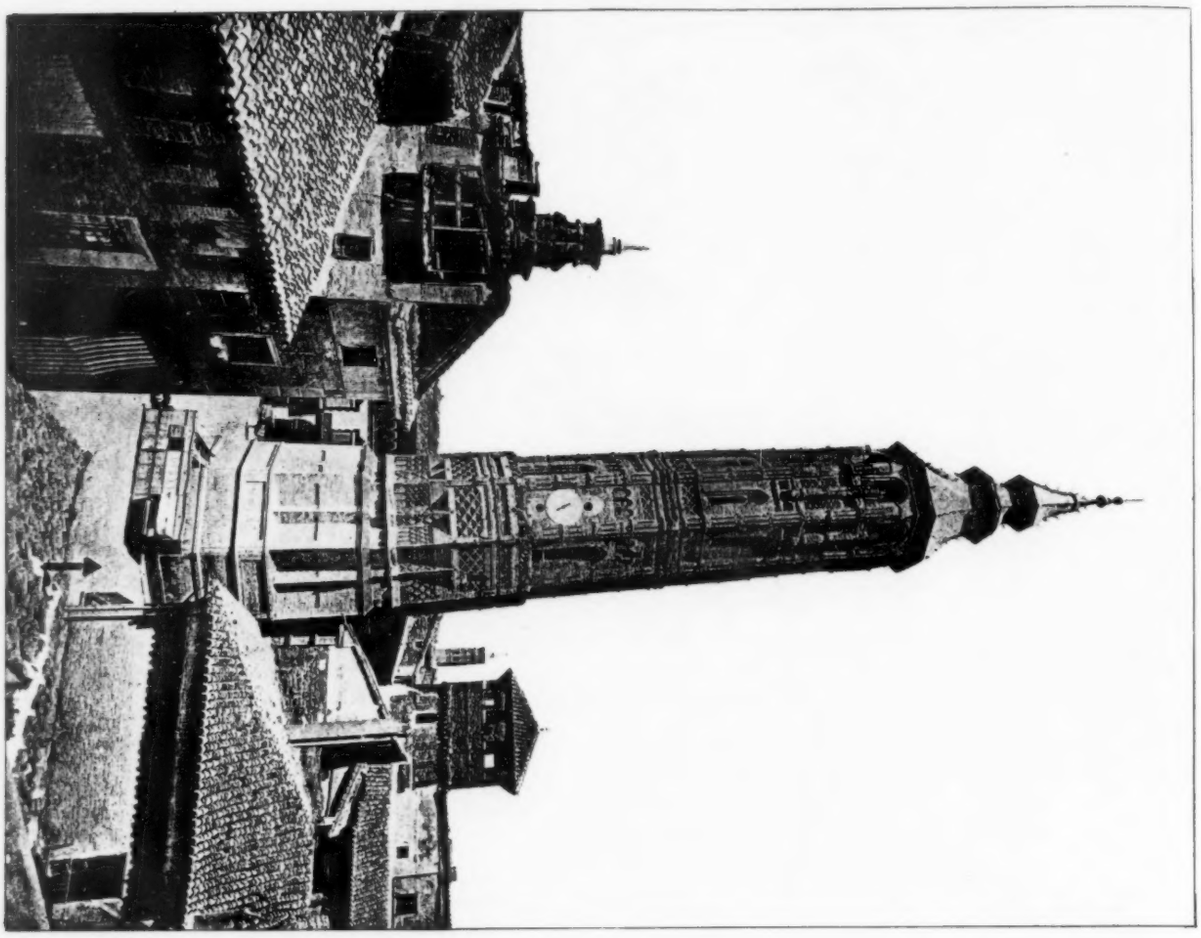
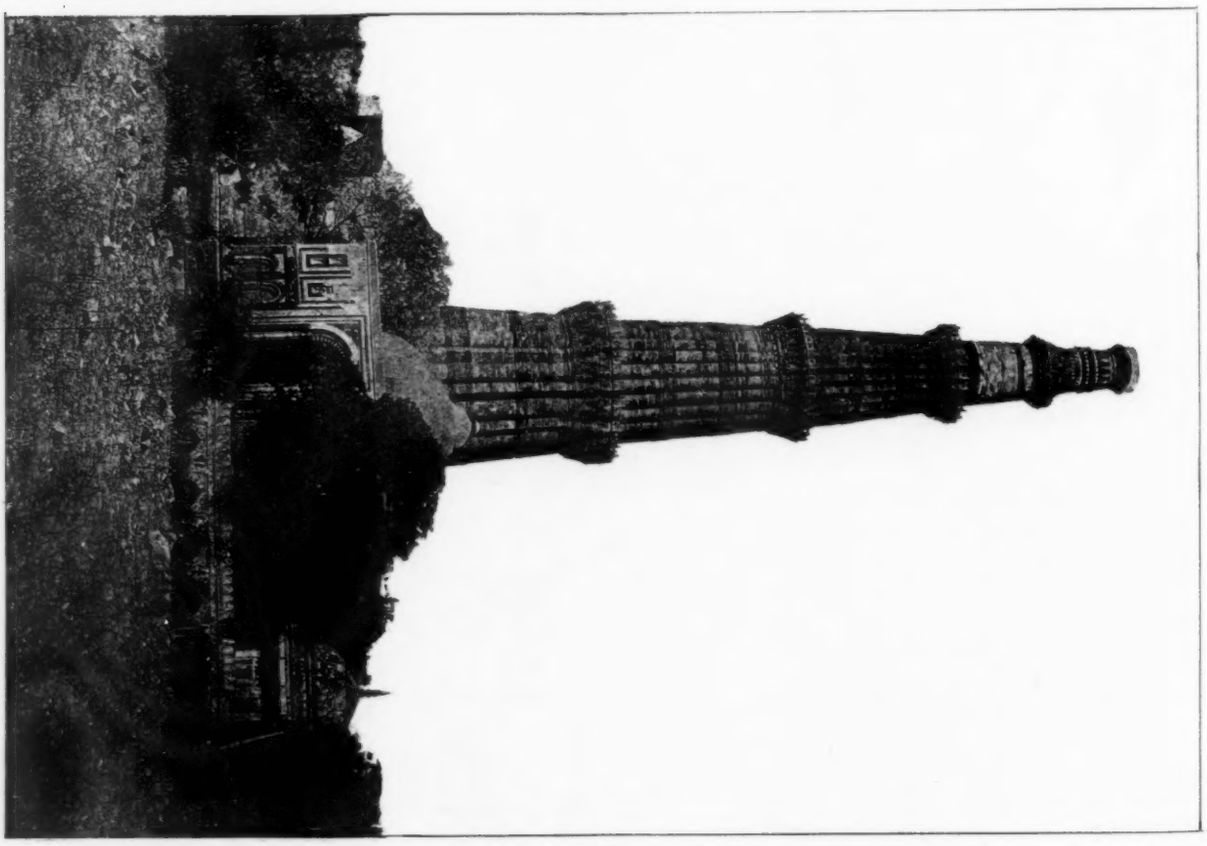


The Leaning Tower, Saragossa, Spain.



The Minar of Kootub, India.

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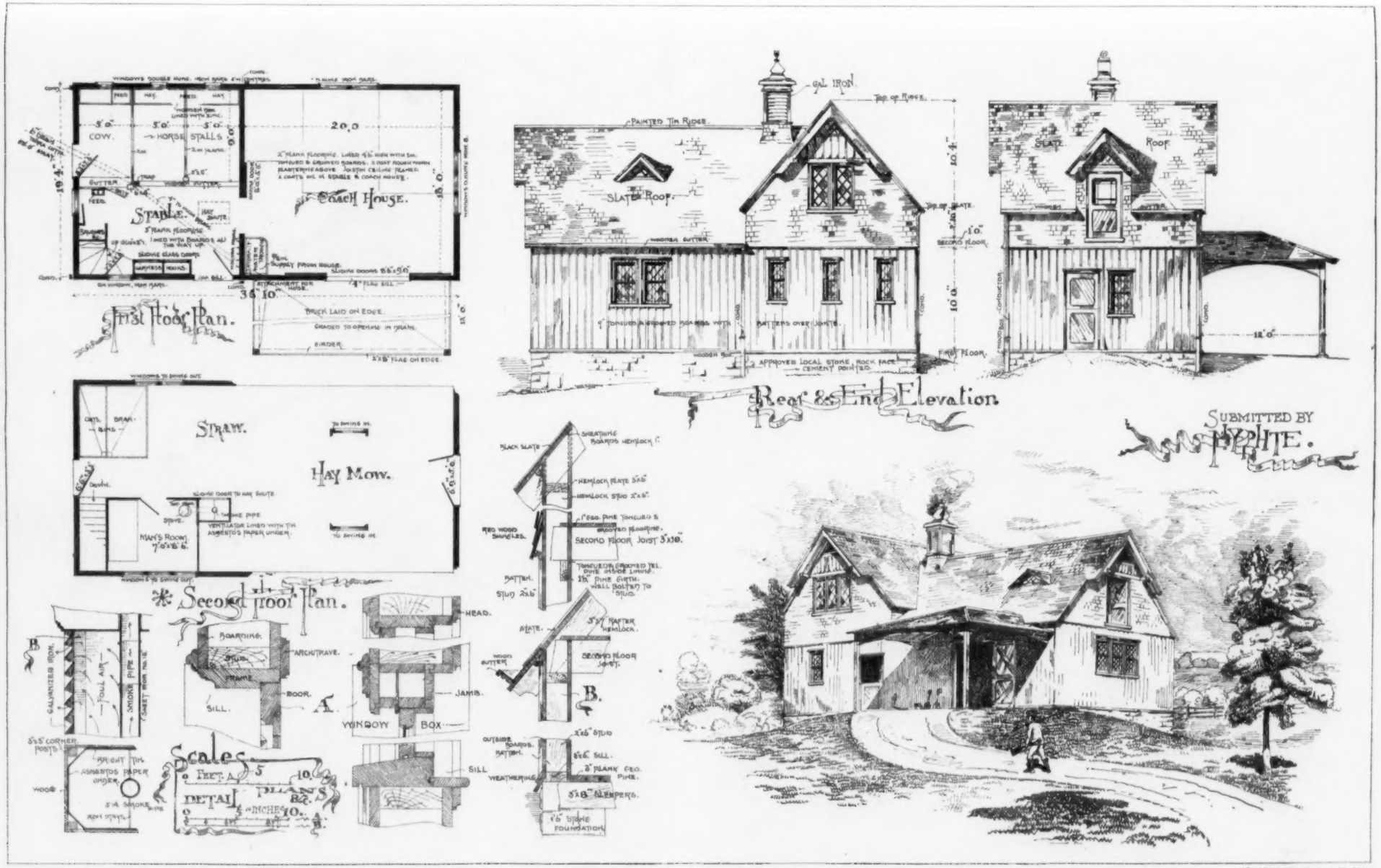

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Plans, Elevations and Details
of the
SEVENTH-DAY BAPTIST CHURCH
at
Newport R. I.
Erected 1729
Restored 1884
George C. Mason Jr. Architect.
Section on line a—a
Floor Plan of Chapel
Elevation of Gallery front
Sketch of plan of shaft and Elevation of top of pillars supporting Gallery
Sketch of brackets on pulpit stairs
Three patterns of balusters of the pulpit stairs
Model in lead's sketches of the Two Newels and
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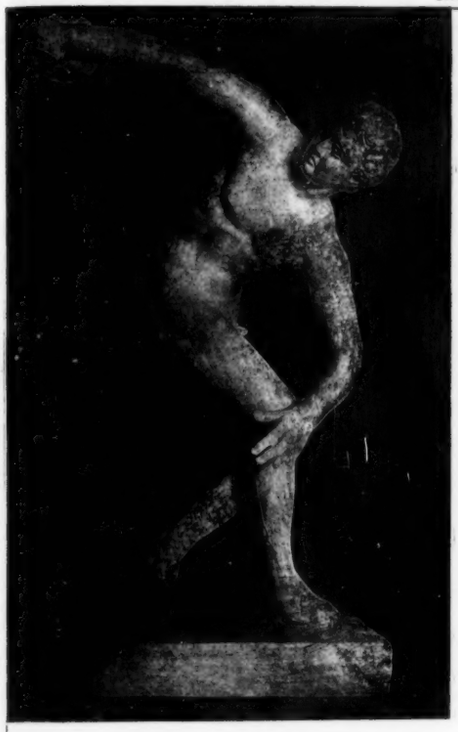

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The Discobolus of Naucydes.

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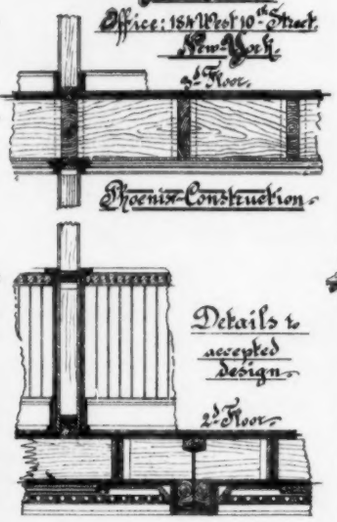
Accepted Design for the C. Nat. Bank

Costs: $22000.00 Pittsburg, Pa.

25'-0

First Elevation.

C. Leo Staub
Architect.
Office: 184 West 10th Street
New York.



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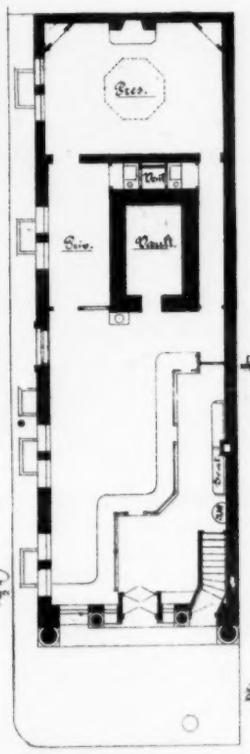
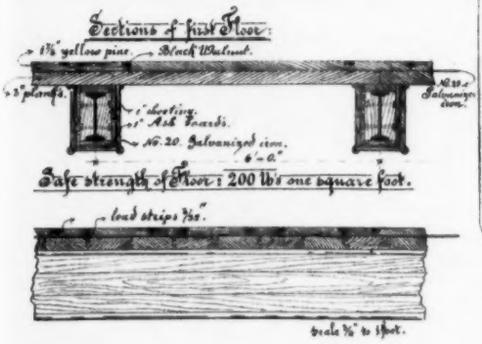
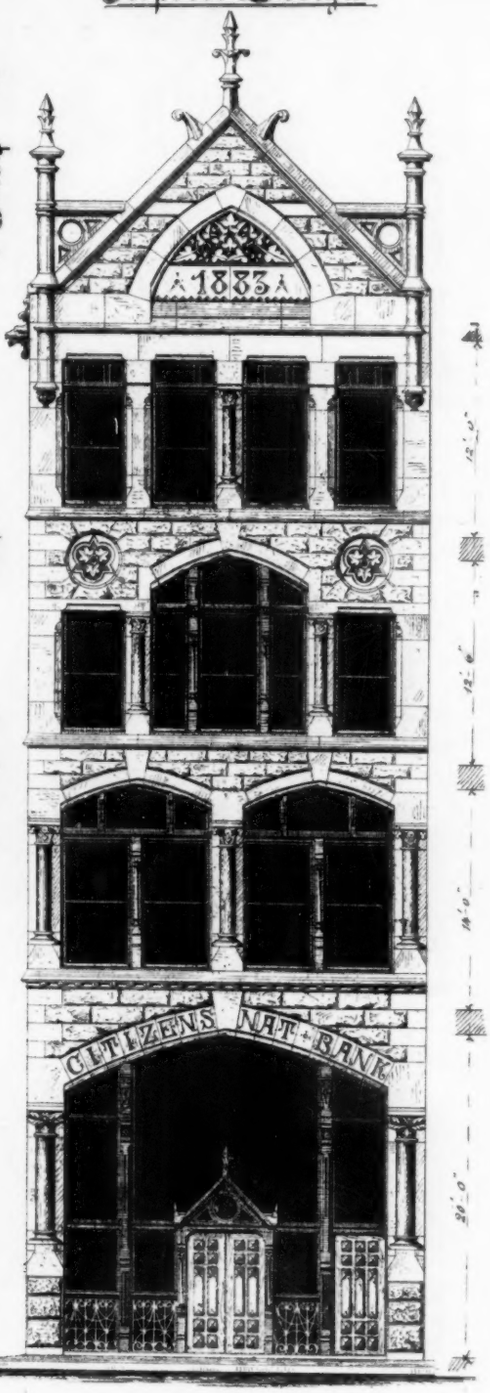
C. Leo Staub
Architect, Inventor &c. &c.



Sections of first Floor:


1 1/8" yellow pine. Black Walnut.
2" planks.
No. 20. Galvanized iron.
Safe strength of Floor: 200 lbs one square foot.
load strips 7/8".
scale 1/2" to 1 foot.

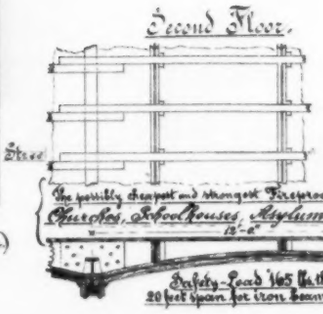
Proposed Design.



25'-0

Second Elevation.

Second Floor.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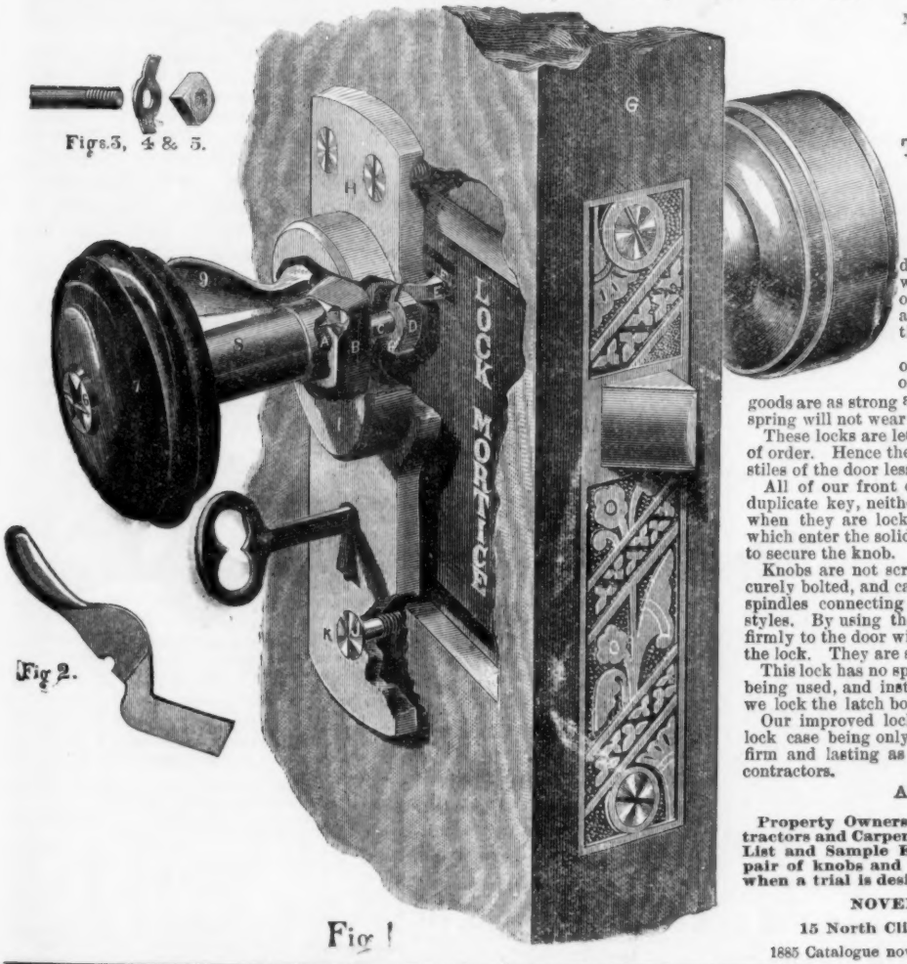

Figs. 3, 4 & 5.

Fig 2.

Fig 1

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The most Simple Lock and Door Knob in existence, and the Strongest.

No more loose knobs and rickety spindles; no binding of the latch-bolt; no wrenching the wrist to turn the knob to open the door; you simply grasp the knob, a slight pressure of the hand will withdraw the latch and open the door.

The knob is as well secured on a thin as on a thick door, which avoids the necessity of using rim locks. The cheap class of goods are as strong and desirable as the more expensive; the spring will not wear out.

These locks are less complicated, have less parts to get out of order. Hence they are smaller and stronger, and cut the stiles of the door less, and are put on with less work.

All of our front door locks are safe and proof against a duplicate key, neither can they be picked from the outside when they are locked on the inside. We use long screws which enter the solid wood above and below the lock-mortise to secure the knob.

Knobs are not screwed on loose, as are all others, but securely bolted, and can never get loose or come off. Have no spindles connecting knobs; they never rattle like the old styles. By using the long escutcheon, we fasten the knobs firmly to the door with two long screws above and one below the lock. They are secured for all time.

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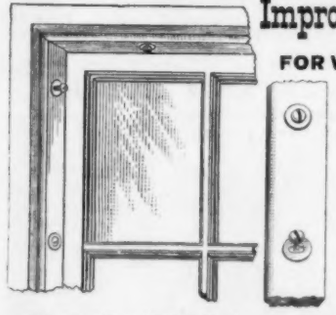

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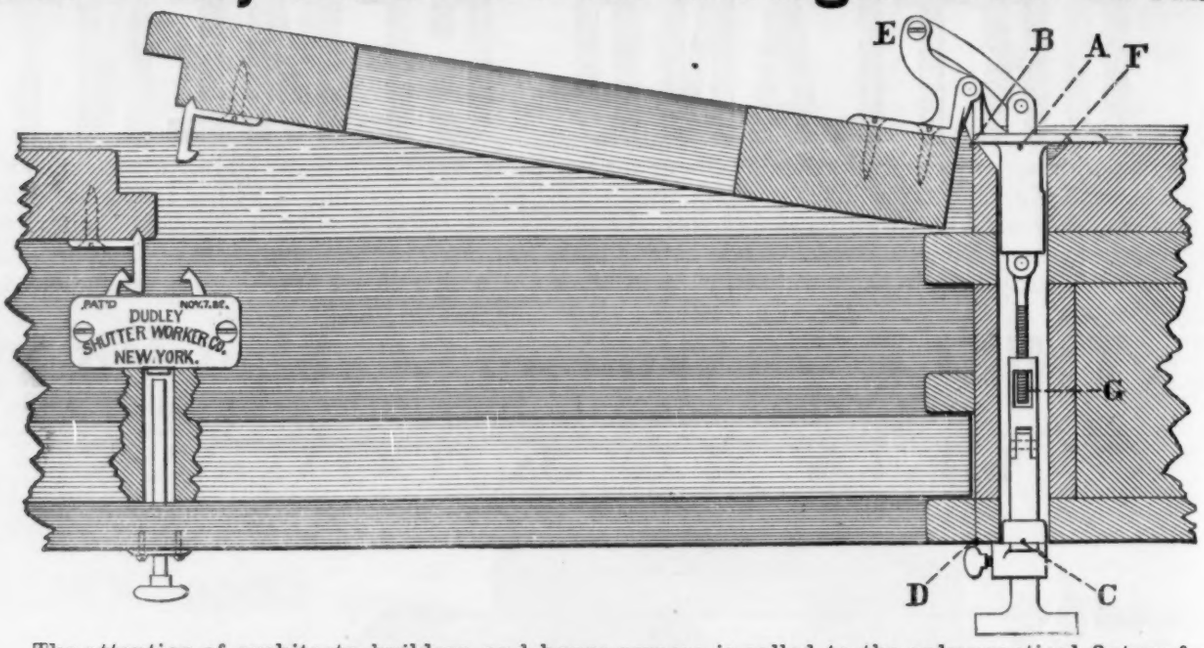

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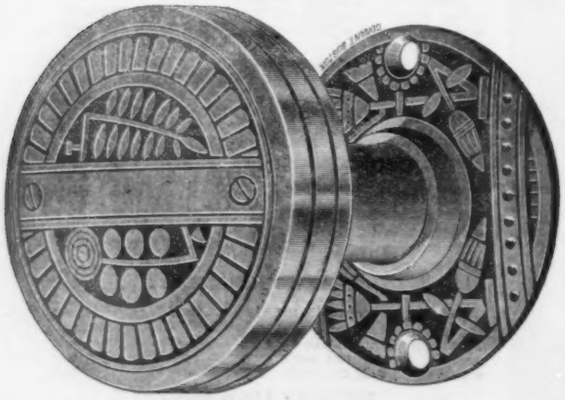

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Read's Patent Harness Bracket.

An Article long wanted but never before made.

Holds the whole harness, takes no more room than the ordinary hook or peg, can be used for both single and double harness. Gives the harness-case a neat appearance, as it carries the harness up uniformly in width with the saddle, beside keeping the bridle and breastplate in their proper shape. They are neatly japanned, with gilt facings. Price **$18** per dozen. Are now in use in over 100 first-class private stables in and about Boston.

Each bracket lettered **"J. J. Read, Boston, Mass."** For sale by dealers everywhere.

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The public are cautioned against all similar brackets, not marked with my stamp, as such brackets are infringements of patents held by me.

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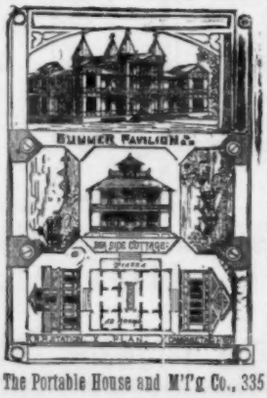

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James. The ceiling is also different, substituting for a simple barrel vault an elliptical and groined system of vaulting.

Whoever may have been its architect, the men who built Trinity Church, in 1724–25, also built the Sabbatarian Church, in 1729. It is not probable that an architect was employed for the latter edifice, but the section of every moulding and detail is the same in both, indicating the use of one set of hollow and round planes by the same hands. The designs of the galleries, piers and panelling are also the same. One feature in the Sabbatarian Church is, however unique; *i. e.*, the pulpit stairs. These stairs, although partaking of all the characteristic features of the best domestic work of the day, are richer in detail and are more delicately wrought than in any other staircase of the time, with which I am familiar. The staircase in Trinity Church is of a much simpler design, and the one in the Christopher G. Champlin house, the best domestic example in Newport, shows much less elaboration.

The panelling under the sounding-board of the Sabbatarian Church is the same as that on the ceiling over the warden's piers in Trinity Church, and the small pedestal on the sounding-board was surmounted by an English crown, probably of the same character as the one still remaining on the organ of old Trinity.

The tablets on the wall back of the pulpit, and shown on drawing, were presented to the Society by Deacon John Tanner, in 1773. The lettering is still clear and bright, with scrolls in the arched tops. Below the decalogue appears the following text from Romans III, xxxi: "Do we then make void the law through faith? God forbid; yea, we establish the law."

There is a legend that when the English army took possession of Newport, in 1777, and desecrated all the places of worship except Old Trinity and the Sabbatarian Church, by using them for riding schools and hospitals, the latter edifice was saved and guarded through respect for the decalogue and the royal crown found within its walls.

The clock, forming the initial cut of this article, hangs on the face of the gallery, between the two central piers, facing the pulpit. It was made by William Claggett, a celebrated horologist of his day in Newport. The clock in the tower of Trinity Church was also made by him, and many of the tall clocks, with sun, moon, stars and signs of the zodiac, frequently found in the possession of old families, bear his name. The church clock has been repaired and is again marking the hours, not of long and prosy sermons dealing with colonial brimstone, which seems to have been a very prominent article in the faith of our ancestors, but striking hour after hour the onward march of Newport's history, down from the eventful and romantic past, into the unknown future. GEO. C. MASON, JR.

COMPETITIVE DESIGN FOR STABLE NEAR PHILADELPHIA, PA., BY "*Nyphte.*"

FOUNDATIONS, 36 perch good local stone, rock-face, cement-pointed joints,	$167
Framing and outside boarding, first floor,	155
Framing and outside shingles, second floor, 300 feet,	35
Slate roof, painted tin flashings and ridgings,	170
Mill-work, complete,	150
Carriage-shed, planed timbers in roof,	95
Outside finish, barges and mouldings,	21
Joists and flooring for first and second floors,	110
Inside board lining, stable (without stalls),	23
Inside board lining, coach-house,	12
Stairs, $15; harness-closet, $15; feed-bins, $14,	44
Hardware, iron bars, complete,	65
Carpenters' work (all extras included),	225
Painting, two coats outside; two coats *oil* inside,	70
Plastering, coach-house,	12
Plumbers' work, complete, without trough,	54
Heating work, stove and sheet-iron to protect walls,	15
Galvanized-iron ventilator, tinning same and smoke-pipe,	38
Brick floors, with flagstone on edges,	25
Architect's fees (a Christmas present),	00
	$1,435

GERMANTOWN, PHILA., December 6, 1884.

"*Nyphte,*" ARCHITECT: —

Dear Sir, — I propose to build the stable as per plans and specifications, for the sum of fourteen hundred dollars.

Respectfully yours, GEORGE HEARST.

My figure is $1,435; Mr. Hearst gave me the estimate for $1,400 before I introduced the brick floor and inside lining for the stable and coach-house.

CITIZENS' BANK BUILDING, PITTSBURGH, PA. MR. C. LEO STAUB, ARCHITECT, NEW YORK, N. Y.

THE present bank building is to have a new front, and three new stories above for offices, while it brings no rental income now, the second story being an empty room which was only built sixteen years ago to give a protected ceiling-light for the banking-room. The materials for the front, which is designed to admit all possible light and at the same time to keep off the street sight, are dark Quincy, Mass., granite for the general architecture, flush surfaces polished, and polished column-shafts of red granite from Iron Mountain, Missouri. Two 15-inch rolled-iron beams support the upper parts of the front in both designs. Cast-iron door-casings and hard-wood finish and window-frames. Mahogany for the banking-room and black walnut for the upper stories. The floors and ceilings are constructed as per detail drawings, C. Leo Staub's "Phœnix-Construction" being adopted throughout for its economy and adaptability to building as quickly as possible, and will render all the fire-proofing and water-proofing desired. (See description in the *American Architect* for February 7, 1885.)

THE MINAR OF KOOTUB, INDIA.

"THE minar is 48′ 4″ in diameter at the base, and, when measured in 1594, was 242′ in height. Even then, however, the capital was ruined, so that some 10 or perhaps 20 feet must be added to this to complete its original elevation. It is ornamented by four boldly projecting balconies; one at 90, the second at 140, the third at 180, and the fourth at 203 feet from the ground; between which are richly sculptured raised belts containing inscriptions. In the lower story the projecting flutes are alternately angular and circular, in the second circular, and in the third angular only; above this the minar is plain, but principally of white marble with belts of the red sandstone of which the three lower stories are composed."— *Fergusson.*

We are indebted to Mr. T. O. Hague of New York for the photograph from which our illustration is copied.

THE DISCOBOLUS OF NAUCYDES.

FOR description see article elsewhere in this issue. The small Discobolus, a reproduction of a cast from a bronze statuette in the Berlin Museum, gives with distinctive variations of its own the attitude of the familiar Discobolus of Myron.

THE LEANING TOWER, SARAGOSSA, SPAIN.

As to other leaning towers, so to this attaches the legend that its inclination was intentional, but the proofs to be found in the window-jambs, in the floors, the stairs, to say nothing of the crushed brick, show that as in other cases the inclination here is due to faulty foundations. This tower, in style a mixture of Arab and Gothic art, stands near the centre of the city in front of the church of San Filippe. It was begun in the reign of Ferdinand II, by the engineer Gabriel Gombao, and was finished in fifteen months, about 1506, and as the structure is of brickwork of some elaborateness, rising to a height of about 270 feet (83m.), it is not surprising that the lines of the building are not as straight as they might be, although the foundations are laid to a depth of about 52 feet (15m.84). The diameter of the octagon at the base is about 42 feet (12m.73). A spiral staircase, winding about the staircase-well, which in 1857 was filled up with masonry to prevent the fall of the entire tower, gives access to the top. The amount of the inclination, which is most apparent from the south side of the city, was in 1741 nearly nine feet (2m.69). At present the inclination appears to begin about 15 feet from the ground, though this is probably due to the base having been rebuilt in 1857, and consequently being still quite plumb. At about two-thirds of the height the tower again returns to the perpendicular. It is so easy a matter for a photographer to distort the inclination of a building of this kind that little reliance can be placed on photographs — the one from which we copy our illustration among the number.

THE SHORING OF BUILDINGS.

THIS was the subject of the fourth of the "Free Lectures on Matters connected with Building," delivered under the auspices of the Carpenters' Company. The lecture was given by Mr. Thomas Blashill on the 4th ult. After speaking of some of the various ways in which structures become insecure and require temporary support during repair, Mr. Blashill continued: —

Next to a knowledge of the ways in which structures become insecure is the question of the methods of making them temporarily safe. Shoring of some kind must generally be employed, and it is important to employ the right kind in the right way.

In the great majority of cases it is not necessary to carry any material portion of the weight of any wall or building. Still less is it required to lift it or to force any inclined wall back into the upright. These last are operations of a very special and exceptional kind. We generally want to stop the present mischief by providing some firm and sufficient resistance to any continued tendency towards falling over. The following headings will cover all these cases: —

1. The flying-shore, which carries no weight, but is generally a trussed beam, placed horizontally between two buildings in order to prevent one or both of them leaning over the vacant space between them.

2. The raking-shore: an inclined prop also used to keep a wall from falling outwards, but which will carry some dead weight if applied very carefully for that purpose.

3. The strut, or dead-shore, used only for carrying weight, and generally placed under bressumers or floors.

4. The needle: a shortbeam supported at the ends by struts and used to carry a short length of walling.

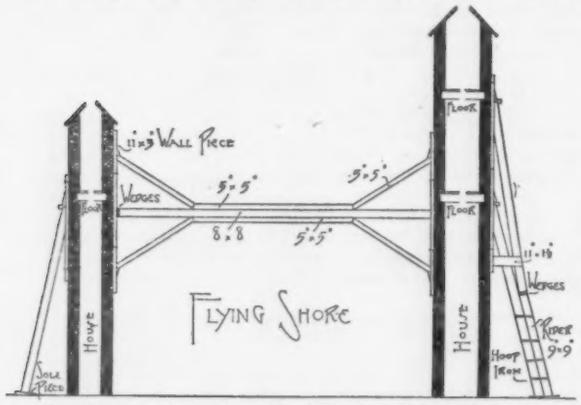
5. Framed systems of shoring and centering used under arches to carry the dead weight of heavy structures during the rebuilding of piers.

6. Shoring used in combination with some mechanical power for forcing walls back into an upright position.

In using any of these contrivances we cannot be too much impressed with the necessity for proceeding gently, so as to avoid all jarring or shock to the building. Shoring is not an affair of sledge-hammers, but should be quietly put in its place and made tight up to its work with wedges, so as not to injure the structure. It should also be fixed so that it can at any time be eased, and finally removed without any violent shock; and, lastly, it should be so arranged that it will be well out of the way of any work that has to be done while it is in its place.

A flying-shore (see diagram) is the best contrivance for preserving the position of a wall that is simply in danger of falling over. The assistance that such a wall requires is usually extremely slight. A horizontal beam is fixed across a street or across vacant ground, each end being carried on a short piece of wood that goes through a plank which is fixed upright against the wall. The beam is braced against these two pieces and has straining-pieces secured to it, to form abutments for the braces, which are stopped on the wall-pieces by cleats. The beam is tightened up at one end by wedges. We shall see how all these parts are used in relation to the raking shore.

Flying-shores can be made of ordinary timber up to a span of between thirty feet and thirty-five feet; for longer spans timber of

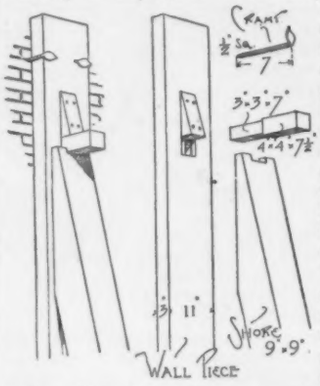


extra length must be used, or the beam must be scarfed. In such cases, great care is necessary to stiffen the beam and to wedge it tight, but flying-shores can be supported and stiffened by connecting them to others above or below them or at a few feet distance, or by taking upright posts up from the ground. When the shore has to be removed, the wedges can be loosened, and the upper braces taken away for a few days if it is desirable to test whether the building has been made secure by the works that have been done to it for that purpose.

A flying-shore placed across a street is usually put to support one house against an opposite house that is supposed to be firm. But when deep excavations are being made in the street the houses on both sides may be supposed to require support from each other, and this is the case when one house in a row has been taken down and the houses left on each side of the gap require mutual support. It is often supposed that the flying-shore should be made stronger, — perhaps twice as strong, — when both houses incline to fall as when only one of them is inclining. But, if each house is exerting a thrust equal to one ton against the shore, the one will simply counteract the other, and the strain upon the beam will be the same as if one house only was pressing with the force of a ton against another house that was standing firm.

In considering the raking-shore, we will go back to the illustration which Professor Kerr gave us of the relation between the beam and the truss. If we have a beam that is fully loaded in the centre we may draw two lines from the point where it is loaded to the two points of support, and if we remove the two upper gusset-shaped pieces outside these lines, the beam will still carry its load. If we remove the remaining substance of the beam, except these two lines and the bottom line, and make the three lines strong enough, we have two rafters in compression and a tie in tension, and these will carry the load. If we provide two good abutments and remove the tie, the rafters alone will carry the load. We will now go a farther and final step and remove one of the rafters, — that which remains is a raking-shore. In order that it should support even the smallest load, it is necessary that, in addition to the abutment at the base, it should have some sufficient resistance at the top to supply the place of the opposite rafter. If there is no such resistance, the load will bring the shore down, describing a curve struck from the foot of the shore. There must first be something to shore from; and, secondly, something to shore to. What such a shore will carry when properly arranged may be accurately calculated according to its degree of inclination. It will carry most weight when it slopes least.

As a matter of practice, the raking-shore is not generally used to carry heavy weights, but to afford such moderate support to a wall or building as may resist its tendency to incline out of the upright.



Heavy weights are carried by dead shores and needles. The first thing is to get a solid foundation to start from. If the ground is soft or loose it may be rammed; if very bad, a floor of plank or stout timbers may be laid down. If vaults or areas exist close to the outer face of the wall, you plant your shore beyond them, or go down to the bottom of them, or use any solid wall you may find between them. When a wide excavation for a sewer is being made in a street, the houses may be shored from whole timbers laid across the street, as well as by flying-shores from house to house. It is generally sufficient to take up a part of the paving and lay the sole-piece on the ground below it with the necessary inclination towards the building.

It used to be the practice to merely plant as many single shores or props as seemed necessary in the ground, to insert the upper ends for a few inches in the parts of the wall that seemed to need them, and to wedge them tight into these holes. The present practice is to observe the part of a wall that needs a shore (or if the whole wall be inclining, to fix on several places a few feet apart), and there to put up shores, as I shall describe.

I have said that you must have something to shore to. Such defective walls as we constantly see are not fit to have a prop put to them in any careless way. For, if the wall is settling and continues to do so — ever so little — after a raking-shore is put, the shore, having no firm resistance at the top to supply the place of the opposite rafter, will be brought down by the weight and will push in the wall. The more the shore slopes out of upright the greater is the danger of this accident. I have seen it happen to one of the unbonded nine inch walls that I have described, which fell inwards upon the chamber floor and the shore after it.

When a flying-shore is made to incline so that its foot comes down on a lower building the danger of injury to the lower building is very considerable.

The safest place for fixing a raking-shore in front of a building is against the end of a party-wall, where most old buildings are insufficiently bonded. There the party-wall gives the necessary resistance, and the same may be said of other cross and return walls. If the part to be supported is between such return walls, the points of support must be fixed near to the under side of the floors, which will offer sufficient resistance.

The mode now adopted for applying the shore to the wall is to provide a long plank, called a wall-piece, fixed upright against that part of the wall which needs support. Pieces of wood, called pins or joggles, are passed through the plank and made to project four inches into the wall, a half brick being removed at each place where the head of a shore is to come in order to admit the joggle. The wall-piece must be carefully fitted to the face of a wall that has strings or other horizontal projections, by packing or otherwise.

It is usually necessary to put more than one shore from the same sole-piece, so that as many as three or four may be made to support the joggles at different heights of the wall-piece. The outer ones may be fixed as "riders" carried on short pieces of timber. Thus, instead of propping a wall at irregular points by several shores having independent foundations, and acting independently against the wall, we have one strongly-framed compound shore, which may be repeated at intervals in the length of the wall as may be required.

As to the manner of fixing: the shore, having been cut to fit in its place, is set on the sole-piece, and the top, which has been cut with a couple of horns to clip the head of the joggle, is brought up to it. It is dangerous to drive up the foot of the shore with a big hammer, as that would certainly give severe shocks to the building, and probably make the shore too tight. It requires to be just brought well up to its place, and no more; with this object a crow-bar is put into a notch cut in the heel of the shore, and it is thus gently levered up until it is felt to be tight. It can then be secured by iron dogs, so that, should the shore become slack, or be subjected to any shock, it may remain fixed at both top and bottom.

In fixing a rider the short piece of timber to form the foot is first set on the sole-piece so as to lie against the back of the shore; the rider is next made to rest on a pair of oak wedges, and is gently brought up so as to clip the joggle by driving the wedges. The feet of the shores are fastened together by hoop iron, which is wrapped round them and well nailed; if necessary the foot of the outer shore might be cut with a very short tenon and dropped into a mortise in the sole-piece. It is the common practice to connect the rider and the shore by nailing stout boards in one or more places across each

side of them, which are continued to the wall-piece, the whole system thus becoming a strong piece of framing in a triangular form. Solid timber might be used instead of the boards, but these are easily fixed and are sufficient for ordinary cases. The cleat that is put above the joggle should be very securely fixed, and may be let into the wall-piece if much strain is expected. It is usually nailed and, practically, has very little to do.

As to the dimensions of timber used in shoring, there is a common practice of using deals, which, from their thinness, bend sidewise as soon as any weight comes upon them. When half-timbers are used there is loss of strength from the same cause. Die-square stuff five inches by five inches to nine inches by nine inches is the best material for shoring, particularly as there is much chance of accident from a side blow or from the pressure of wind.

Fir is the best timber to use, on account of its straightness of grain, cheapness, and lightness when being moved.

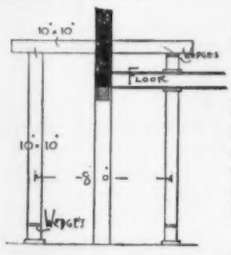
The way in which raking-shores may be employed to carry dead weight is shown in the operation of removing a column from the arcade of a church. The shores, two or four in number, and perhaps used together with struts and needles, are placed opposite to each other, so that the indirect action of each of them against the part supported may be counterbalanced. In Viollet-le-Duc's "*Dictionary of French Architecture*" some examples of this are given.

The action of raking-shores is a question which those acquainted with mathematics may study with advantage. The whole question of shoring and underpinning has recently been dealt with in a book published by Batsford, High Holborn, price 4*s.* 6*d.* It was written by the late Cecil Haden Stock, an earnest student in architecture, who managed to do this very useful piece of work at an unusually early age.

The various ways in which the dead-shore or strut is useful need not be catalogued. As a temporary support for girders during the rebuilding of a wall, or during the replacing of a column, it is in common use. I have seen such struts fixed by simply driving them into their place with a sledge-hammer, which very seriously shakes a building. They should be wedged up at the bottom, driving the wedges very gently, and stopping as soon as the strut is made tight. The timber should be solid and sound. One sometimes sees three or four deals lashed together, and made to do duty as a strut. It should be better known that the strength of a column or strut depends very materially on its thickness or diameter, and that three deals, however firmly you may fix them together, are very far short of the stiffness of a post of solid timber of the same dimensions. The utmost care must be taken to see that the strut is set on a solid foundation. A soft subsoil, old vaults, or cesspools must be searched for, and a good sill of timber used to start from.

We now come back to our old friend the beam, pure and simple. The "needle" is a short beam loaded at the centre, and usually carried at each end by a strut. It should be of good, sound, and solid timber, and if it is ever necessary to use a combination of deals, they should not be laid flat upon each other (as is often done), but placed edgewise, bearing in mind that a nine-inch by three-inch deal so placed is three times as strong as the same deal laid on its side. Wrought-iron rolled joists are now very often used as needles, for they only require a hole of four inches in width, instead of ten inches or a foot.

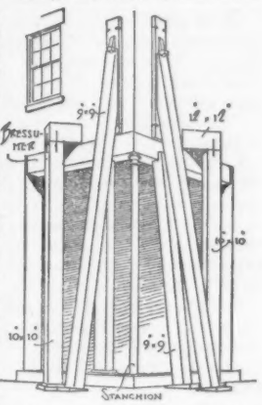
You first strut up the floors, not trusting to the bottom floor without examination. Put some timber in the window openings, and support any balconies or projecting parts. Raking-shores are then put to steady the upper part of the house, and the needles are passed through holes under the solid parts of the walling. If any of the struts cannot be fixed sufficiently near to the front the needles must be made longer, and stiffened by strong raking-pieces from the foot of the struts. The bressummer is then passed into its place, bedded, and the brickwork over it made good in cement.



It is often necessary to make a large opening in a front or cross wall, high up or in a position where struts cannot be easily fixed. Then a number of square frames may be made, best of iron, consisting at top and bottom of short needles joined by uprights at the ends. These are put through the walls in the place of ordinary needles, the bottom pieces resting on the brickwork, the tops pinned up tight to the wall above. The brickwork along the wall is then cut away of depth sufficient to admit the girder, and after it is made right the frames may be removed and the wall below may be cut away to form the opening. In the same way an arch may be turned over an intended opening by making the temporary frames of height sufficient to suit the rise of the arch. There is a good illustration of this plan in the *Builder* for 1859.

In order to place or to change the column at the angle of a building, a needle is put through the corner diagonally with other needles and raking-shores, of which two should stand close to the corner. When a raking-strut is put under a bressummer, catching it with a bird's mouth, remember that there is the same danger and need of good resistance at the top, as in the case of a raking-shore, and that the more nearly upright the strut is the safer and stronger it will be.

Whether the formation of an extra basement beneath a building shall be a dangerous or a safe operation depends chiefly on the way in which the shoring is arranged and maintained during the work of underpinning. The most obvious course is to secure the walls of all adjoining buildings by flying-shores and by raking-shores planted on the old level of the ground, *deferring the excavation until the underpinning is completed.* This is executed in lengths of about four feet by sinking shafts at intervals along the face of each wall and needling all parts that require it. The mass of earth that has afterwards to be excavated is thus made to support the shoring and the timbering of the shaft until the adjoining buildings are made secure.



A party-wall, the lower part of which was split and ruinous, had to be underpinned, and raking-shores were applied to it. These stood upon soft "made" ground, with a trench close behind them, another trench being made between the shores and the wall for the purpose of underpinning. In that condition of insecurity the wall was left with the rotten work cut out and several courses of underpinning left still undone from Saturday to Monday.

You may be surprised to hear that no accident happened, — more surprised, perhaps, that I tell this story, — for, if it proves anything, it proves that such work will stand. I am sometimes met by a man whom I have warned for doing something of this kind with the triumphant announcement that nothing has happened. One can only reply that it ought to have happened, and this leads me to make the following observation. There are many things done in dealing with old buildings which may or may not be dangerous, — one can only judge by the result. The thing is an experiment. What shall we say of it? I say it is risky. Let me offer that most useful word for your careful consideration. I do not find it in the dictionary, yet I can count over twenty words in the column where it ought to be that will never be of the least use to any of us as long as we live!

It is never worth while, for the sake of a saving in trouble, or even in cost, to run risks that are plainly to be seen. All prudent constructors go a great deal farther than that. From a sense of risks that are not obvious, or that may only arise at a distant time, we usually make all kinds of beams strong enough to carry three or four times the greatest weight they are expected to bear. Columns are made of ten times the strength that might seem to be necessary. Provision is thus made for contingencies, and yet accidents sometimes happen in spite of this caution. — *The Builder.*

THE DENVER CAPITOL COMPETITION.

CLEVELAND, O., April 23, 1885.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — You have probably seen a copy of the "Notice to Architects," issued by the Board of Capitol Managers, Denver, Colorado. In view of the stand taken by your paper recently on such munificent offers, it may be of interest to you to see at least one answer to this circular. We trust they will receive many such. The following is a copy of our letter to them. Use your judgment as to its use. Very respectfully, EISENMANN & BLUNT.

April 21, 1885.

TO THE HONORABLE BOARD OF CAPITOL MANAGERS, DENVER, COL.: —

Gentlemen, — A copy of your "Notice to Architects" has just been received. We beg leave to state that we consider it, like many others emanating from similar Boards, a fine bit of satire as well as slightly impertinent. The terms offered are such that no architect of standing and self-respect can enter the competition. The successful man is offered $1,500 for work for which our customary charge is 2½ per cent on the contract price, or in this case $25,000! The total offer is $26,500, or a little over 2½ per cent, for the responsibility of the expenditure of $1,000,000, aside from the large expense attendant on five years' supervision and drafting of all plans and specifications. A commercial man would laugh such an offer to scorn. Why should a professional man do otherwise?

Very respectfully, EISENMANN & BLUNT.

THE PROPER COMMISSION ON ALTERATIONS.

LANCASTER, PA., April 10, 1885.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — I have prepared plan, elevation, details, and made all necessary measurements for the remodelling of a store front in this city; I had no superintendence of the work. The probable cost is $750. Please state what per cent commission I should receive on such work, as endorsed by the American Institute of Architects.

Very truly yours, C. E. URBAN.

[The American Institute of Architects leaves the rate of compensation to architects for work costing less than ten thousand dollars to be fixed by the parties themselves. Many architects have a printed schedule of their own fixing rates for small commissions, which, in such a case as this, would probably average about twenty per cent on the cost for full service, with twenty-five to fifty dollars additional for making measurements. If

superintendence were not given, three-tenths of the fee would be deducted. — Eds. American Architect.]

PHILADELPHIA'S BUILDING AND REAL ESTATE OUTLOOK.

To the Editors of the American Architect: —

Dear Sirs, — The outlook for the building interests in Philadelphia and surrounding section is encouraging and satisfactory, and the prospects are excellent for a continued improvement as the season advances. Not for some time have the chances been so favorable for good and profitable business. The transactions in real estate have, since the opening of spring, been quite heavy. The volume of trade has been especially large in the northern and northwestern portions of the city, where extensive architectural operations are being developed, clearly indicating a prospective increase in the number of new houses as soon as the weather will permit the commencement of construction. The financial consideration of the real-estate transfers recorded in the Philadelphia Recorder of Deeds office from January 1 to the same period in March amounted to $3,337,000, while during the latter month additional transfers increased the amount to $4,262,000, thus exhibiting a vast real estate business. Other important transfers, that are sure to be negotiated before the building season is inaugurated, will swell the sum to the enormous figure of $7,000,000, one investment that is to be placed some time in May aggregating over a million dollars.

Capitalists and builders have schemes partially mapped out for the erection of an immense number of new dwellings during 1885, and it is confidently believed that, with the exceedingly cheering prospects for trade, and the low prices governing materials, there will not be an idle mechanic in Philadelphia and the suburban districts by the first of July next. The prominent builders, architects, and other operators who depend on the building industry for support, are actively preparing for the advent of the promised good times, and, so nearly perfect are their arrangements, that but little remains to complete the plans satisfactorily. It is possible that all classes of mechanics, carpenters, bricklayers, masons and plumbers will receive an increase in compensation, and it is certain there will be no cutting down in the wages of general laborers. These statements are based upon information obtained from those who are thoroughly well posted upon the situation, and are considered competent authority. Contrary to all reports, there is not the remotest possibility of any aggressive labor movements being engineered, and which might interfere with, and retard, building operations.

Interviews with representative constructors have developed the fact that several thousand houses, ranging in size from eight to twenty rooms, and supplied with every modern convenience, will be built. Besides these, there will be erected several French flats, numerous special buildings, several churches of magnificent proportions, and half a dozen or more public institutions, among which the Taylor College for Women, to be constructed at West Philadelphia, will be an imposing and model edifice. The architecture of the dwellings will be very handsome and elaborate, surpassing in beauty of design anything that has previously been attempted in the Quaker City, the architects employed for the work being among the most celebrated in the country. The peculiarly ornate decoration of the first-class houses in the fashionable centre of Philadelphia is rapidly enhancing values, and, consequently, there is a great and commendable rivalry among architects and builders to exceed each other in the displays and beautiful adornments. W. A. E.

THE ARCHITECTS OF W. H. VANDERBILT'S HOUSE.

New York, April 11, 1885.

To the Editors of the American Architect: —

Dear Sirs, — We notice in your number of to-day, page 178, that you name as architects of Mr. Wm. H. Vanderbilt's house Messrs. Atwood and Snook.

It is a matter of record, and we supposed it to be very generally known that Herter Brothers were the architects of that building, and are the only persons responsible for the designs, both of the exterior and the interior.

For further information we might add that of the two gentlemen named by you, Mr. Atwood was employed by our firm at that time as a draughtsman, and Mr. Snook by Mr. Vanderbilt as general superintendent.

Hoping you will have the kindness to make this correction, we are

Yours truly, Herter Brothers.

[We presume that our reason for saying that Messrs. Atwood and Snook were the architects of this house was very similar to the reason which caused Messrs. Herter Brothers to take out the building permit in the name of these gentlemen. — Eds. American Architect.]

BOOKS ON DETAIL DRAWINGS.

New York, N. Y.

To the Editors of the American Architect: —

Dear Sirs, — Would you let me know through your paper the text-book for in and out-side detail drawings for country houses? Also, a good book for interior arrangements for factories, breweries, gas-factories, etc.

I shall be very much obliged to you if you can advise me.

Yours, D.

[W. T. Comstock, 6 Astor Place, New York, can probably furnish you with as good books on detail drawings as are published in this country. We know of no books on factory and brewery planning. — Eds. American Architect.]

CRITICISING THE WORK OF YOUNG ARCHITECTS.

Savannah, Ga., March 20, 1885.

To the Editors of the American Architect: —

Dear Sirs, — It has occurred to me that you might materially assist many of the younger members of the profession, who are subscribers to the *American Architect*, by giving them, through its columns, the benefit of professional criticism upon their efforts. To this end I would propose that you invite the younger or "weaker" members of the profession to submit to you their designs, that you examine and give through your paper a brief criticism, setting forth the merits or shortcomings of the same. Should any of the drawings be deemed worthy of reproduction, they could be published, if you saw fit. I would have particular stress laid upon the architectural merit of a design rather than upon the draughtsmanship.

I think thus, without taxing your time or patience too much, you could do a great deal towards extending a helping hand to a certain class of your subscribers.

At the South, generally speaking, the architect is not sought after as is the case at the north, and as a result there is not the same opportunity offered to the young men in the profession for self-improvement as elsewhere.

A little competent criticism will do much towards pointing out the right way. Should the number of designs submitted prove too great a tax upon your good nature, a small fee to be charged for the services rendered would reduce it, while at the same time it would not prove a barrier to those who wish to be benefited by your criticism.

Very truly, W. B. W. Howe, Jr.

[This letter contains the germs of an idea to which we have sought frequently a way to give effect, but without success. We often wish we could be accorded the privilege of publishing real criticisms of many of the designs which are now put forth without a word to show why they are not as good as the best, and so given a currency which is flattering to the author, while it is not the best thing for the art. It would be unprofitable in every sense to publish criticisms for the benefit of an individual, as would be unillustrated remarks, and it would be a dangerous experiment to use any of our present illustrated pages for the purpose of explaining that a certain design was indifferent, poor, impossible or atrocious. As for playing the part of private mentor, we have neither time nor inclination. — Eds. American Architect.]

A BOOK ON STEAM-HEATING.

Cincinnati, O., April 27, 1885.

To the Editors of the American Architect: —

Dear Sirs, — You state in your paper to write to John Wiley & Son for W. J. Baldwin's "*Steam Heating for Buildings, or Hints to Steam Users.* Where are they? You do not say.

H. T. Duke & Co.

[Address John Wiley & Son, 15 Astor Place, New York. — Eds. American Architect.]

AN EXPERT IN LIGHTNING-RODS.

Albany, N. Y., April 22, 1885

To the Editors of the American Architect: —

Dear Sirs, — Will you kindly give me the names and addresses of the professionally expert in the putting up of lightning-rods?

Yours truly, Y. T.

[Read Spang's "*Practical Treatise on Lightning Protection,*" published by Van Nostrand, New York, and be your own expert; or address Henry W. Spang, Reading, Pa. — Eds. American Architect.]

SARACENIC ARCHITECTURE.

Providence, April 14, 1885.

To the Editors of the American Architect: —

Dear Sirs, — Is there any work in existence that treats of the "Saracenic" style as distinct from the usual Oriental treatment?

Yours truly, H. B. Ingraham.

[Knight's "*Saracenic Remains,*" which illustrates the work of the Normans in Sicily, is a somewhat rare work. — Eds. American Architect.]

NOTES AND CLIPPINGS.

Another Name for Zoan. — Another name has been added to Zoan. Mr. Petrie has identified it with Avaris, the stronghold of the shepherd kings, 3,500 years ago! So now we have Avaris, Zoan, Tanis, San. We have seen a photograph of the monumental proof, just from Mr. Petrie's hands. — *Boston Transcript.*

Hours of Labor on the Continent. — A committee of the Société Industrielle de France was recently appointed to consider the feasibility of shortening the hours of labor in the textile and collateral industries. At present the hours throughout France are rarely, if ever, under twelve per day, while in Germany they are still longer, being thirteen at Dusseldorf, thirteen to fifteen at Treves and Aix-la-Chapelle, and even sixteen in Franconia — this, too, without deductions for Sundays and holidays. After mature consideration, however, the committee have come to the determination that it is impossible to recommend the reduction, in face of the great competition from England and Germany, which shows clearly enough that it is upon low wages and long hours, no less than the advantages of an excellent system of technical education, that France depends for her success in competition with England in the industrial markets of the world. — *Cabinet Maker and Art Finisher.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

315,815. DRIVE-WELL POINT.—Miles H. Morris, Chicago, Ill.

315,818. STEAM RADIATOR AND HEATER. — Thos. M. Morton, Pittsburgh, Pa.

315,822. KILN FOR BURNING BRICKS. — John O'Brien, Turner's Falls, Mass.

315,836. VAULT-COVER. — John Raynald, Philadelphia, Pa.

315,838. BURGLAR-ALARM. — William H. Reiff, Philadelphia, Pa.

315,839. SET-SCREW. — Frank A. Reiher, Chicago, Ill.

315,845. LATCH.—John R. Scott, Chicago, Ill.

315,849. BRICK-MACHINE.—Peter L. Simpson, Minneapolis, Minn.

315,861. WINDOW-BLIND SLAT-FASTENER. — John M. Van Dyke, Washington, N. J.

315,902. PLASTERING, CALCIMINING AND PAINTING MACHINE.—Theodore H. Brown, Viroqua, Wis.

315,912. APPARATUS FOR COLLECTING AND DRYING THE SEDIMENTARY MATTER OF SEWAGE. — Robert Corscaden, Providence, R. I.

315,930. CONSTRUCTION AND PRESERVATION OF SHINGLE ROOFS. — Henry W. Gates, Kennedy, N. Y.

315,946. PLASTER COMPOUND. —George L. Gregory, Marion, Iowa.

315,958. SKYLIGHT. — Bernard Overman and William H. O'Connor, Washington, D. C.

315,962. STONE-DRESSING MACHINE. — John B. Ross, Rahway, N. J.

315,970. HYDRAULIC ELEVATOR FOR BUILDINGS.—Allan Stirling, New York, N. Y.

315,977. ROOFING FOR BUILDINGS AND OTHER STRUCTURES.—Seth G. Tufts, Malueville, O.

315,999. ALARM FOR SHOP-DOORS. —Antoine Bénézit, Villeneuvesur-Lot, France.

316,037. DOOR-HANGER. — Hiram A. Holmes, Epsom, N. H.

316,050. DUMB-WAITER. — Wellington B. Moyer, Reading, Pa.

316,055. STEAM-RADIATOR. — John B. Pierce and Joseph Bond, Buffalo, N. Y.

316,056. STEAM-RADIATOR. — John B. Pierce, Buffalo, N. Y.

316,057. COMBINED WASTE AND OVERFLOW-VALVE.—William A. Piet, Glenbrook, Conn.

316,070. HYDRAULIC ELEVATOR. —Henry F. Shaw, Boston, Mass.

316,079. PLANE. — Justus A. Traut, New Britain, Conn.

316,083. WALL-DECORATING MATERIAL. — Oliver E. Vail, Chicago, Ill.

316,098. LATCH AND LOCK COMBINED. — Edwin R. Wethered, Woolwich, County of Kent, Eng.

316,110. SEWER-GAS TRAP. — Russel H. Beckwith, New York, N. Y.

316,115. LOCK FOR SLIDING-DOORS.—Geo. Cassady, Valley Springs, Dak.

316,131. SHUTTER-WORKER.—Alvin H. Dodd, Hudson, N. Y.

316,132. LOCK. —John W. H. Doubler, Rockford, Ill.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report sixty permits have been granted, the more important of which are the following: —

S. Frank, five-st'y brick warehouse, n s Baltimore St., between Howard and Eutaw Sts.

J. H. Lee, three-st'y brick building, s e cor. North and Chase Sts.

T. S. Wellenger, three-st'y brick building, n e cor. Chase and Ensor Sts.

C. Nicolaus, three-st'y brick building, n s Biddle St., w of Wilcox Alley.

J. G. Bramble, 11 two-st'y brick buildings, commencing s w cor. Patterson Park and Fairmount Aves.

H. R. Curley, 10 two-st'y brick buildings, e s Scott St., n of Ostend St.

W. J. E. Dixon, 6 two-st'y brick buildings, commencing n w cor. Payson and Marianna Sts., and 7 two-st'y brick buildings, n s Marianna St., w of Payson St.

S. D. Price, 2 two-st'y brick buildings, w s Peabody St., s of Preston St.

Lentz & Lingerman, 2 three-st'y brick buildings, w s Hanover St., between Clement St. and Fort Ave.

J. B. Harig, three-st'y brick building, s s Hill St., between Charles and Hanover Sts.

P. Hanrathy, three-st'y brick building, n e s Richmond St., between Park and Tyson Sts.

Jos. Parson, 9 three-st'y brick buildings, n s Chase St., e of Greenmount Ave.

W. J. H. Gluck, three-st'y brick building, w s Gay St., between Front St. and the Falls.

A. S. Clayton, 2 three-st'y brick buildings, w s Vincent Alley, n of Baker St.

Adolph Storck, three-st'y brick building, w s East St., between Ensor and Hillen Sts.

J. G. Gehring, 2 three-st'y brick buildings, w s Gay St., between East and Chestnut Sts.

Emil Gail, three-st'y brick building, w s Gay St., between East and Forrest Sts.

Michael Dundon, three-st'y brick building, e s Light St., between Warner and Montgomery Sts.

United Brethren Church, 3 three-st'y brick buildings, s s Perry St., between Sharp and Hanover Sts.

Chas. F. Muller, three-st'y brick building, n w cor. Haw and Emory Sts.

Henry Westphal, 9 two-st'y brick buildings, w s Byrd St., s of Barney St., and 10 two-st'y brick buildings, w s Patapsco St., between Heath and Barney Sts.

T. Carter, 6 two-st'y brick buildings, s s McHenry St., commencing s w cor. Norris Alley, and 2 two-st'y brick buildings, w s Norris Alley.

A. Hanneman, 12 two-st'y brick buildings, n s Hanneman Ave., between Ann and Wolfe Sts.

Edw. Key, 16 two-st'y brick buildings, n w s Washington Road, commencing at Stockholm St.

H. Dolman, 6 three-st'y brick buildings (square), n s Smyth St., commencing n e cor. Myrtle Ave.

Wm. B. Whiteside, 3 three-st'y brick buildings, e s Fremont St., n of Dauphin St., and 3 three-st'y brick buildings, n s Dolphin St., e of Fremont St.

Boston.

BUILDING PERMITS. — *Brick.* — *St. Botolph St., Nos.* 113 *and* 115, dwell., 26′ x 42′; owner, Joseph Feldman; builder, O. W. Patrick.

Wood. —*Crawford St.*, near Elm Hill Ave., dwell., 28′ x 34′; owners and builders, Wood & Weatherbee.

Storage, 90′ x 150′; owner, Hoosac Tunnel Dock Elevator Co.; builder, H. W. Ball.

Summer St., storage, 50′ x 120′; owner, Maverick Wharf Co.; builder, A. J. M. McLaren.

Lee St., near Hayes St., stable, 20′ x 22′; owner, Michael Shanahan.

Batchelder St., cor. Albion St., carriage-house, 20′ x 30′; owner, E. L. Haiser; builder, G. Penney.

Jackson St., near Dorchester Ave., stable and storage, 30′ x 30′; owner, James Young; builder, D. A. Medbury.

Mechanics St., s w. dwell. and carriage-house, 18′ x 22′; owner, Joseph Gahne; builder, Jesse Jones.

Chestnut St., No. 6, dwell. and carriage-house, 18′ x 22′; owner and builder, same as last.

Dorchester Ave., No. 455, stable, 44′ x 100′; owner and builder, L. E. H. Jones.

Milton St., opposite Armandine St., dwell., 23′ x 32′; owner and builder, F. E. Kennedy.

Dorchester Ave., opposite Bay St., dwell. and store, 22′ 6′ x 32′′; owner, T. H. Le Masney; builder, John Bass.

West Seventh St., No. 54, dwell., 23′ x 36′; owner and builder, Patrick White.

C St., near West Seventh St., dwell., 19′ x 34′; owner and builder, Edward Devin.

Walnut St., near Eriesson St., dwell., 20′ x 28′; owner, Henry D. Buor; builder, H. P. Oakman.

Brooklyn.

BUILDING PERMITS. — *Metropolitan Ave., No.* 78, s s, near Olive St., three-st'y (brick-filled) tenement, tin roof; cost, $4,500; owner, Patrick McGuire, 349 Mauger St.; architect, E. F. Gaylor; builder, John Rueger.

Pacific St., n s, about 150′ w Nostrand Ave., 2 three-st'y front and four-st'y rear brown-stone dwells., tile and tin roofs; owner, Wm. Evens, Jr., and Chas. S. Whitney, 1218 Pacific St.; architects, Geo. P. Chappell & Co.; builders, James Ashfield & Son and Morris & Selover.

Lorimer St., s e cor. Frost St., 3 three-st'y frame (brick-filled) stores and tenements, tin roofs; cost, each, $4,000; owner, Elizabeth Coleman, Pierrepont House, Brooklyn; architect, E. F. Gaylor; builder, John Fallon.

Sumpter St., n s, 186′ w Rockaway Ave., 3 two-st'y frame (brick-filled) tenements, tin roofs; cost, $5,100; owner, Chas. H. Dyett, 111 East Fifty-seventh St., New York; builder, C. Monds.

Greenpoint Ave., s s, 100′ w Manhattan Ave., 5 two-st'y frame offices, gravel roofs; cost, each, $2,000; owner, Clark D. Rhinehardt, cor. Meserole and Newel Sts.; architect, Fr. Weber; builder, not selected.

West St., s e cor. India St., four-st'y frame tenement, gravel roof; cost, $10,000; owner, Mary E. B. Murray, 207 Washington Park; architect, Fr. Weber; mason, Martin Vogel.

Putnam Ave., n s, 40′ w Throop Ave., 2 three-st'y brown-stone dwells., tin roofs; cost, each, $9,000; owner, John F. Saddington, 462 Willoughby Ave.; architect, F. D. Vrooman.

Seventh Ave., e s, 21′ n Carroll St., 2 three-st'y brown-stone dwells., tin roofs; cost, about $7,000 each; owner and builder, Mr. Wooley, on premises; architect, Robert Dixon.

Putnam Ave., n s, 80′ w Throop Ave., 3 two-st'y brown-stone dwells., tin roofs, wooden cornices; cost, each, $7,000; owner, John F. Saddington, 462 Willoughby Ave.; architect, F. D. Vrooman.

Jefferson St., s s, 250′ w Throop Ave., 5 three-st'y brown-stone dwells., tin roofs; cost, each, $6,000; owners, etc., Phillips & Weild, 543 Greene Ave.

Heyward St., n s, 100′ w Broadway, two-st'y brick stable, tar and gravel roof; cost, $4,900; owner, Henry Newman; architect, Ernest Dennis; builder, John Auer.

Vanderbilt Ave., e s, 114′ s Fulton St., four-st'y brick flat, felt and gravel roof; cost, $14,000; owner and builder, Joseph I. Kirby, 73 Gates Ave.; architect, Amzi Hill.

Lafayette Ave., s w cor. Sumner Ave., four-st'y brown-stone flat, tin roof, wooden cornice; cost, $12,000; owner and builder, P. Concannon, cor. Van Buren St. and Sumner Ave.; architect, I. D. Reynolds.

Lafayette Ave., s s, 25′ w Sumner Ave., 14 two-st'y and three-st'y rear brown-stone dwells., tin roofs; cost, each, $5,600; owner, architect and builder, same as last.

Park Pl., s s, 275′ e Rogers Ave., four-st'y pressed-brick store and tenement, tin roof; cost, $7,000; owner, Peter Murphy, Rochester and East New York Aves.; architect, Ernest Dennis; builder, Charles Harlow.

Plymouth St., s w cor. Main St., 3 five-st'y brick warehouses, gravel roofs; cost for all, $98,000; owner, The Nesmith Estate, 117 Remsen St.; architect and builder, Thomas Stone.

Bergen St., No. 290, 150′ w Third Ave., four-st'y brick tenement, gravel roof; cost, $6,000; owner and contractor, Thomas Stone, 471 State St.

Gates Ave., s s, 145′ w Marcy Ave., 4 four-st'y stores and flats, gravel roofs; cost, each, $10,000; owner and builder, W. H. Aldrich, 503 Gates Ave.; architect, Thos. S. Godwin.

Madison St., s s, 190′ e Reid Ave., two-st'y brick dwell., tin roof; cost, $3,600; owner, Conrad Seimell, 585 Lorimer St.; architect, M. D. Randall; builders, I. & J. Van Riper and Stephen & Randall.

Jefferson St., No. 128, s s, 280′ w Evergreen Ave., two-st'y frame (brick-filled) dwell., tin roof; cost, $3,500; owner and builder, Chas. Treshmann, cor. Bushwick Ave. and Bremen St.; architect, Th. Engelhardt.

Newell St., e s, 225′ n Nassau Ave., three-st'y frame (brick-filled) tenement, tin roof; cost, $4,000; owner, Andrew Waldron, Newell St.; architect, Amzi Hill; builder, S. B. Waldron.

Harrison Ave., No. 116, w s, 45′ n Middleton St., three-st'y frame (brick-filled) store and tenement, tin roof; cost, $4,000; owner, Mrs. Barbara Frank, on premises; architect, Th. Engelhardt; builder, B. Frank.

North Eleventh St., n w cor. Second St., three-st'y brick factory and 3 one-st'y brick factories; cost, total, $10,000; owner and builder, Francis Storms, on premises; architect, E. F. Gaylor.

Freeman St., s s, 50′ w West St., dyewood factory, tin roof; cost, $15,000; owner, N. Y. Dyewood Extract and Chemical Co., 161 Front St., New York; architect, Joseph Ireland; builders, Berton & Nickel and Hamilton & Henry.

Herkimer St., n s, 297′ w Ralph Ave., three-st'y frame tenement, tin roof; cost, $3,950; owner, Louis Klaue, Herkimer St.; architect, Jacob Hertlin; builders, Christian Baur and Jacob Hertlin.

Fulton St., s s, 99′ w Grand Ave., three-st'y stone, brick and terra-cotta theatre, etc., tin roof, brick and stone cornice; cost, $35,000; owner, James M. White, 233 Park Pl.; architect, M. J. Morrill; builders, T. B. Kutan and J. T. Stafford.

ALTERATIONS. — *North Eleventh St.*, s s, 188′ 7′′ w Third St., six-st'y brick extension, gravel roof; cost, $12,000; owners, Poulson & Elger, North Eleventh St.; architect, F. A. Winslow; builders, W. & T. Lamb, Jr., and B. Gallagher.

Fulton St., Nos. 335 *and* 337, through to Washington St., add one-st'y, also four-st'y brick extension, also new store front; cost, $7,000; owner, Edwin A. Goater, 287 Fulton St.; architect, M. J. Morrell; builders, P. J. Carlin and Morris & Selover.

Bedford Ave., s w cor. Lexington Ave., add three-st'y stores and flats, tin roofs, cost, $18,000; owner, J. H. Ireland, Quincy St., near Bedford Ave.; architect, I. D. Reynolds; builders, C. King and M. C. Rush.

Chicago.

BUILDING PERMITS. — J. Poske, two-st'y dwell., 263 Webster Ave.; cost, $3,000.

N. W. Lodge, I. O. O. F., three-st'y store and hall, 428 West Chicago Ave.; cost, $11,000.

H. G. Hutchinson, 5 two-st'y flats, 79-85 Avon Pl.; cost, $10,000; architects, Wilson & Moody; builders, G. Lehman & Co.

H. V. Bemis, six-st'y hotel, 187 and 188 Michigan Ave.; cost, $22,000; architect, H. V. Bemis; builder, A. Elmer.

J. Buckley, three-st'y store and flats, 895 West Madison St.; cost, $6,000; architects, Wilson & Moody; builders, G. Lehman & Co.

H. E. Rassing, three-st'y flats, 214 Huron St.; cost, $7,000; architect, L. J. Halberg; builder, R. Knight.

Mrs. N. Clark, two-st'y dwell., 880 Washington St.; cost, $5,000; architect, G. A. C. Smith; builder, W. R. Clark.

Sigmond & Co., stable, 192 Chicago Ave.; cost, $4,000; architect, H. Kley.

F. Thulmann, three-st'y store and dwell., 96 Clybourn Ave.; cost, $6,000; architect, Blumenthal.

A. Ganska, two-st'y store and dwell., 880 Twenty-first St.; cost, $4,000; architect, A. Bessler.

Geo. Kronberger, three-st'y flats, 247 Bissell St.; cost, $10,000; architect, T. Karls; builder, P. Young.

M. A. Seymour, three-st'y dwell., 397 Ontario St.; cost, $12,000; architects, Burling & Whitehouse.

R. C. Rounsvelt, 2 two-st'y flats, 292 and 294 Webster Ave.; cost, $8,000.

R. C. Rounsvelt, two-st'y dwell., 296 Webster Ave.; cost, $4,000.

C. M. Youngstrom, two-st'y dwell., 56 Locust St.; cost, $4,000.

H. H. Nathan, three-st'y store and dwell., 1565 Milwaukee Ave.; cost, $7,000; architect, H. Meissner.

C. T. Nash, three-st'y dwell., 329 Ashland Ave.; cost, $6,000; architect, F. B. Townsend.

St. Joseph's Home, four-st'y addition, 407 and 409 South May St.; cost, $10,000; architect, J. Dillenburg.

B. Quirk, 3 two-st'y dwells., 644-654 and 660 Carroll Ave.; cost, $6,000.

C. P. McKay, 2 two-st'y dwells., 287 and 289 Hermitage Ave.; cost, $8,000.

New York.

RIDING-SCHOOL.—For the gentlemen's riding-school, on Fifty-eighth St., between Fifth and Madison Aves., an extension, 50′ x 200′, extending through to Fifty-ninth St., is to be built from plans of Mr. B. L. Gilbert.

STEAM-STATION. — The New York Steam Co. propose to build a steam-station on lots on One Hundred and Fifteenth and One Hundred and Sixteenth Sts. and East River, to cost $500,000.

STORES. — At No. 40 Canal St. a five-st'y brick store and dwell., 21′ x 40′, is to be built for Mr. Chas. Klingenstein, at a cost of $10,000, from plans of Mr. E. W. Grauert.

For Messrs. Donaldson Bros., a five-st'y brick and stone store, about 50′ x 125′, is to be built on the n s of Park St., 116′ 6′′ e of Pearl St., to cost $35,000, from plans of Mr. R. H. Robertson.

On Bloomfield and Little Twelfth Sts., between Tenth and Thirteenth Aves., a two-st'y brick and

iron store, to cost $65,000, is to be built for Messrs. John Glass & Son, from plans of Mr. G. A. Schellenger.

Messrs. Bondy, Lederer & Co. will have built a six-st'y tobacco warehouse, 48′ x 110′, to be built on the n e cor. of First Ave. and Sixty-ninth St., from plans of Messrs. A. B. Ogden & Son.

The Marvin Safe Co. propose to build a factory on South Fifth Ave. and Thompson St., between Prince and Houston Sts.

BUILDING PERMITS. — *Chrystie St., Nos.* 173 *and* 175, one-st'y brick boiler-house, tin roof; cost, $3,000; owner, Harry Miner, on premises; architect, Henry J. Dudley.

Harrison St., No. 8, five-st'y brick warehouse, tin roof; cost, $13,000; owner, Wm. F. Nesbet, Yonkers, N. Y.; architect, Thomas R. Jackson; builder, Hugh Getty.

Harrison St., No. 12, five-st'y brick warehouse, tin roof; cost, $12,000; owner, W. H. B. Totten, 315 West Seventy-third St.; architect, Thomas R. Jackson; builder, Hugh Getty.

Jacob St., No. 14, six-st'y brick and iron front printing-house, plastic slate roof; cost, $35,000; owner, Mary B. Harmon, 68 East Thirty-fourth St.; architect, Alfred H. Thorp; builders, Jas. Hamel & Son and J. B. & J. M. Cornell.

Washington St., No. 109, six-st'y brick tenement and store, tin roof; cost, $13,500; owner, L. O'Connor, 111 Washington St.; architect, John P. Leo; builders, Walter Somers and P. J. Connor.

Ninth St., s s, 76′ w Second Ave., four-st'y brick tenement, tin roof; cost, $10,000; owner, John B. Hagenbueckle, on premises; architect, Julius Boekell.

Forsyth St., Nos. 7, 9 *and* 11, 3 five-st'y brick tenements, tin roofs; cost, each, $13,000; owner, Henry Horn, 479 Broadway; architect, Henry Dudley.

Pike St., No. 31, five-st'y brick tenement, tin roof; owner, F. C. Lawrence, 267 Fifth Ave.; architect, J. E. Terhune.

White St., No. 20, six-st'y brick (iron front) store and lofts, tin roofs; cost, $24,000; owner, Leon Mandel, 20 East Seventieth St.; architects, Cleverdon & Putzel; builder, not selected.

Canal St., No. 232, and *Walker St., No.* 118, eight-st'y brick store, tin roof; cost, $20,000; lessees, Oxley, Giddings & Enos, 224 and 230 Canal St.; architects, Wm. Field & Son.

Bristow St., s s, 195′ w Jennings St., three-st'y frame dwell., slate and tin roof; cost, $3,500; owner, Jos. Richardson, Cypress Ave. and One Hundred and Thirty-fourth St.

One Hundred and Forty-ninth St., s s, 150′ w Courtlandt Ave., three-st'y frame tenement, tin roof; cost, $4,600; owner, Stephen Long, 632 East One Hundred and Forty-ninth St.; architect, Wm. Kusche.

One Hundred and Sixtieth St., n s, 175′ e Courtlandt Ave., three-st'y frame dwell., tin roof; cost, $5,500; owner, Anton Standinger, 607 East One Hundred and Sixtieth St.; architect, A. Arctander.

ALTERATIONS.—*Sixth Ave., Nos.* 165, 167 *and* 169, one-st'y brick extension, also internal alterations; cost, $6,500; lessee, A. C. Cammeyer, 151 East Twenty-first St.; architect, Chas. Rentz.

First Ave., No. 103, raise one-st'y and a one-st'y extension on front, also internal alterations; cost, $6,000; owner, Fred. W. Bayer, on premises; architect, J. Boekell.

Jane St., No. 128, raise building two and a half stories and internal alterations; cost, $12,000; owner, John D. Hass, 242 East Broadway; architect, A. H. Blankenstein.

Broadway, n e cor. Bond St., new passenger-elevator, light court and internal alterations; cost, $7,000; owner, Adele L. S. Stevens, by U. S. Trust Co., attorney; architects, Alfred Zucker & Co.; builders, P. Tostevin's Sons.

Broadway, No. 372, part of the rear wall rebuilt, put in elevator; cost, $5,000; owners, heirs of Samuel Wyman, 32 Warren St.; architect, Samuel A. Warner; builders, Masterson & Harrison.

Madison Ave., No. 250, raise two stories and internal alterations; also a six-st'y extension; cost, $70,000; owner, M. N. Forney, 431 Fifth Ave.; architects, J. C. Cady & Co.; builder, not selected.

West Twenty-third St., No. 56, alter building for business purposes; cost, $10,000; owner, Wm. H. Jackson, on premises; architect, John Sexton.

South St., No. 93, rebuild front wall, iron girder over first story, and internal alterations; cost, $3,000; agent for owner, Edward A. Cruikshank, Brooklyn; builders, Peter Doyle and Daniel McEnenry.

Fifth Ave., No. 299, two-st'y brick extension, first-st'y floor, take out front and part of side wall in first-st'y, and put in iron girder, new store front, etc.; lessee, Henri O. Watson, 241 Fifth Ave.; architect, Geo. A. Freeman, Jr.

Philadelphia.

SCHOOL-HOUSE. — The Committee on Property of the Board of Education have bids for the erection of a new school-house in the Thirty-first Section, to be located at Sargeant and Emerald Sts. The contract was awarded to Thomas Cassidy, whose bid of $38,000 was the lowest. The other bidders were: Thos. Campbell, $43,390; William Thompson & Bro., $48,775; John O'Donnell, $44,975; Chas. O'Neill, $44,900; and Franklin, $43,073. Contracts were also awarded for repairs on a number of schools in the various sections.

BUILDING PERMITS. —*Sansour St.*, w of Thirty-ninth St., two-st'y stable, 27′ x 37′; Jno. C. Kelly, contractor.

Ringgold St., w s, below Poplar St., 20 two-st'y dwells., 16′ x 40′; Jno. M. Sharp, owner.

Ringgold St., e s, below Poplar St., 13 two-st'y dwells., 15′ x 40′; owner, same as last.

Poplar St., s s, e of Twenty-fifth St., 3 three-st'y dwells., 18′ x 58′; owner, same as last.

Twenty-fourth St., w s, below Poplar St., 13 three-st'y dwells., 16′ x 52′; owner, same as last.

Twenty-fifth St., w s, below Thompson St., 5 two-st'y dwells., 15′ x 41′; J. C. Morison, owner.

East Norris St., No. 908, two-st'y dwell., 18′ x 40′; C. G. Harris, contractor.

North Twenty-fourth St., No. 1715, two-st'y dwell., 18′ x 38′; Jno. Cronin, contractor.

Tioga St., w of Eighteenth St., 8 three-st'y dwells., 18′ x 56′; Chas. L. Loney, contractor.

Dryson St., between Oregon and Seneca Sts., 22 two-st'y dwells., 14′ x 28′; J. D. Thornton, owner.

Market St., between Oregon and Seneca Sts., 11 st'y dwells., 14′ x 28′; owner, same as last.

Bridge St., No. 261, three-st'y dwell., 18′ x 54′; Jacob Wengellinger, contractor.

Warnock St., above Huntingdon St., 2 two-st'y dwells., 14′ x 48′; C. E. Coulson, contractor.

Huntingdon St., e of Eleventh St., 4 three-st'y dwells., 16′ x 56′; contractor, same as last.

Germantown Road, above Huntingdon St., 4 three-st'y stores, 17′ x 50′; contractor, same as last.

Germantown Road, above Huntingdon St., 6 two-st'y dwells., 15′ x 50′; contractor, same as last.

American St., n w cor. Dauphin St., three-st'y factory, 67′ x 114′ 8″; Jas. McCartney, contractor.

Broad St., e s, above Catharine St., convent-building, 36′ x 52′; Dubois & Welsh, contractors.

Thirty-fifth St., above Race St., three-st'y dwell., 17′ 6″ x 40′; Jno. Doyle, contractor.

Ninth St., below Arch St., four-st'y store, 19′ x 73′; Robert F. Strode, contractor.

Style St., No. 48, three-st'y dwell., 16′ 8″ x 44′; Thos. Waters, contractor.

Indiana Ave., s e cor. Boudinout St., 7 two-st'y dwells., 14′ x 28′; Jacob Peters, contractor.

Chestnut St., Nos. 117 *and* 119, 2 stores, 20′ x 82′; Chas. P. Westerhood, contractor.

Sixty-fourth St. and Paschall Ave., 2 two-st'y dwells., 18′ x 42′; R. H. Parker, contractor.

Shawmont Ave., e of Ridge Ave., two-st'y dwell., 18′ x 44′; Wilson Rex, contractor.

Poplar St., w of Fortieth St., 2 two-st'y dwells., 16′ x 48′; Steinmetz & Thompson, contractors.

Fifth St., above Columbia Ave., three-st'y factory, 54′ x 56′; Geo. Kessler, contractor.

Ringgold St., below Berks St., 13 two-st'y dwells., 16′ x 40′; H. R. Schoch, owner.

Taylor St., below Berks St., 57 two-st'y dwells., 16′ x 40′; owner, same as last.

St. Paul, Minn.

BUILDING PERMITS. — Two-st'y frame dwell., cor. of Exchange and Walnut St.; cost, $23,000; owner, Horace B. Bigelow.

Two-st'y dwell., s s Lincoln Ave., bet. Oakland and Dale Sts.; owner, Julia N. Goforth; cost, $5,400.

Two-st'y frame double dwell., s s of Iglehart, bet. Rice and Josette Sts.; cost, $5,000; owner, Patrick E. Murphy.

Two-st'y frame dwell., n s of College Ave., bet. Rice and Third Sts.; cost, $8,500; owner, P. S. Harvis.

Two-st'y frame dwell., e s of Bradley St., between Clark and Whitall; cost, $2,490; owner, J. B. Pugsley.

Three-st'y brick store and dwell., w s of Dakota Ave., bet. Fairfield and Indiana Sts.; cost, $7,000; owner, James Jordan.

Two-st'y frame dwell., s s of Isabel St., bet. Boswell and Winslow; cost, $2,000; owner, H. L. Tillman.

Three-st'y frame addition to Manufactory n s of Fourth St., between Locust and John Sts.; cost, $2,200; owners, Blodgett & Osgood.

Two-st'y frame double dwell., s s of Lincoln Ave., between Oakland and Dale Sts.; cost, $3,000; owner, F. F. McIver.

Two-st'y frame double store and dwell., e s of Park Ave., bet. Manitoba and Winnepeg Sts.; cost, $1,800; owner, L. A. Strom.

Two-st'y frame double dwell., s s of Grove St., bet. DeBow and Mississippi; cost, $6,000; owner, Catherine A. Finehout; cor. Grove and Cooper St.

Two-st'y frame dwell., n s of Edmund St., bet. Rice and Marion; cost, $1,730; owner, John Kraug.

Two-story frame dwell., s s of Forest St., bet. Dawson and Margaret; cost, $1,300; owner, W. F. Thompson; store n s of e Seventh St., bet. Waukesha and Cedar Sts.; cost, $2,000; owner, John Kline.

Two-st'y frame double dwell., w s of Maria St., bet. Fifth and Sixth St.; Cost, $4,500; owner, H. Damkroger.

Three-st'y brick Veneer double store and dwell., n s of Rice St., bet. Iglehart and Summit; cost, $9,000; owner, T. F. McCormick.

Two-st'y frame dwell., n s of Iglehart, bet. Kent and Dale; cost, $2,000; owner, M. D. Miller.

Two-st'y brick store and dwell., n s of e Seventh St., bet. Bradley and Burr; Cost, $5,000; owner M. Mullane.

Two-st'y frame dwell., e s of Douglass, bet. Smith and Ramsey St., $2,490; owner, James Cady.

Two-st'y frame dwell., s s side of College Ave., bet. Peter and Rice Sts.; cost, $2,780; owner, Peter Bender.

Two-st'y frame dwell., Evergreen Ave.; cost, $2,000; owner, J. H. Bryant.

Four-st'y brick block store and dwell., n s of e Fifth St., bet. Robert and Minnesota Sts.; cost, $25,000; owners, H. A. Town and C. G. Higher.

St. Louis.

A. Alt, two-st'y brick dwell.; cost, $8,000; Kirchner, architect, Mulcahey & Milburn, contractors.

W. & S. Padberg, two-st'y double brick dwell.; cost, $5,000; Paulus & Weidemüller, contractors.

J. Burdeau, two-st'y brick dwell.; cost, $4,000; John H. Dunlap, contractor.

J. M. Carpenter, two-st'y brick store and dwell.; cost, $6,000; A. Beinke & Co., architect,

M. Lane, two-st'y brick dwell.; cost, $4,000; M. Lane, contractor.

G. B. Morgan, three-st'y brick dwell.; cost, $6,000.

C. C. Murphy, two-st'y brick dwell.; cost, $5,000; J. Johnston, architect.

C. C. Murphy, two-st'y brick dwell.; cost, $5,000; J. Johnston, architect.

T. L. Waldecker, 2 adjacent two-st'y brick dwells.; cost, $4,200; H. R. Becker, contractor.

A. Brothers, two-st'y brick addition to dwell.; cost, $5,000; A. Druiding, architect; J. H. Frye, contractor.

P. J. Pauly, two-st'y brick dwell.; cost, $15,000; F. Mayer, architect, N. Risse, contractor.

Schaeffer Bros. & Powell, two-st'y brick warehouse; cost, $2,500; N. Risse, contractor.

N. Risse, two-st'y brick dwell.; cost, $4,000; N. Risse, contractor.

COMPETITION.

STATE-HOUSE.

[At Denver, Col.]

STATE OF COLORADO,
OFFICE OF THE BOARD OF CAPITOL MANAGERS,
DENVER, April 16, 1885.

In pursuance of an Act of the Fifth General Assembly of the State of Colorado, entitled "An Act to provide for the erection of a State Capitol Building at the City of Denver, and creating a Board of Management and Supervision, and appropriating funds therefor," plans and specifications for a Capitol building which, when erected, shall not cost to exceed one million of dollars, will be received by the Board of Managers **until 12 o'clock meridian, on the tenth day of July, 1885.**

The said Capitol building will be erected upon the summit of a plat of ground in the city of Denver, State of Colorado, known as Capitol Hill, with its principal façade to the west. The length of said building to be about 300′, and no plans will be considered for a building that are over 310′ in length. The breadth, height and general form must be in such proportion to its length as to constitute a symmetrical building, and must be constructed with special regard to strength and durability. The facing and ornamentation of the superstructure, including cornices, pediments and ballustrades, will be of stone.

Drawings must consist of foundation, sub-basement, basement, or first, second or third story plans, roof plans, and section of same, longitudinal section, transverse section, front, rear and end elevations, dome plan, giving section of same and material used, and method of construction from base to summit. Also giving diameter or area of base, style of architecture and extreme elevation.

The said Capitol building shall be built of stone, brick and iron, as far as practicable, and of material found in the State of Colorado, provided the same can be found in said State as cheaply as other materials of like quality in other localities. The entire building must be made as nearly as possible fireproof. The laws of acoustics must be carefully observed. The materials used in said building must be of the best quality. Provision must be made for steam-heating apparatus, and for the drainage, lighting and ventilation of said building in the most approved manner; and such a number of fireproof vaults as may be necessary for the preservation of the books and papers of the various departments of the State Government; also for elevators, water closets, etc.

All plans and scale drawings must be put on wooden frames or stretchers in order that they may be convenient for examination, and on a scale of one-eighth of an inch to one foot.

Compensation for plans and specifications will be as follows: For the best set of plans and specifications the sum of $1,500; for the second, $1,000; for the third, the sum of $800. All plans and specifications for which money is paid shall become the property of the State. The architect whose plans are adopted will be required to furnish the same in duplicate. For the detailed working plans and supervision, the amount shall not exceed two and one-half per cent of the cost of said building. No plan will be adopted until it shall be definitely ascertained that the entire cost of said Capitol building shall not exceed the sum of $1,000,000.

Said building must contain the following rooms, and such other rooms as convenience and symmetry require:

The sub-basement shall be eight feet between joists, and adapted to the use of the machinery, etc., of the building.

The basement story to be not less than fourteen feet between joists, and extend twelve feet above the surface of the surrounding ground. Said basement story to be divided into rooms to be used for the Adjutant-General's quarters, Historical Society, Horticultural Society, State Geologist and Mineral Cabinet, Commissioner and Inspector of Mines, and Storage Rooms.

First, or principal office story, to be not less than twenty feet between joists, and to contain, as near as practicable, the following rooms, to wit:

Three rooms for the Governor.
Same for Secretary of State.
Three rooms for Auditor of State.
Same for State Treasurer.

Two rooms for Insurance Department, two rooms for Attorney-General, three rooms for State Engineer, three rooms for Railroad Commissioner.

Four rooms for State Board of Land Commissioners, three rooms for Superintendent of Public Instruction.

Second, or double story, to be not less than forty-two feet between joists. The Senate Chamber, Hall of House of Representatives, Supreme Court Room and State Library to be of full height, other rooms to be approximately half of said height.

One Senate Chamber, with lobbies and galleries of appropriate dimensions, to accomodate fifty Senators; one room for Lieutenant-Governor and President, one room for Secretary of Senate, one Post-office, one Stationery and Bill room, one Sergeant-at-Arms room, cloak room, lavatory and closets; two rooms for Engrossing Committee, two rooms for Enrolling Committee, and not less than ten other appropriate committee rooms for use of Senate.

One hall for House of Representatives, with lobbies and galleries of appropriate dimensions, to accomodate one hundred members; one room for Speaker of the House, one room for Chief Clerk of House, one Post-office, one Stationery and Bill room, one Sergeant-at-Arms room, cloak room, lavatory and closets, two rooms for Engrossing Committee, two rooms for Enrolling Committee, and not less than ten other appropriate committee rooms for the use of House of Representatives.

One State library room, one Librarian's room, and ten committee rooms.

One Supreme Court room, one law library room, one Clerk of Court room, one Marshal of Court room, one consultation room, six judges' private rooms, with fireproof vaults, lavatory and closets attatched.

Public lavatory and closets on each floor of said building.

The drawings must be sent to the "Board of Capitol Managers," Denver, Colorado, and be endorsed "Plans for State Capitol Building," and must come under a *nom de plume*, the real name and address to be sent to